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THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. XII January, 1923 No. 1

PROSPECTUS, 1923

I. COOPERATION WITH LOCAL SCHOOLS

The Brooklyn Botanic Garden aims to cooperate in every practicable way with the public and private schools of Greater New York on all matters relating to the study of plants. The purpose of the Garden in this connection is to supplement and enrich the school work in the way of instruction, demonstration, study material, etc., which otherwise would not be available.

A. Talks at Schools.—The principals of public or private schools may arrange to have lantern talks given at the schools on various topics related to nature study, such as garden work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Address the Curator of Elementary Instruction for list of talks and for appointments.

B. School Classes at the Garden.—(*a*) Schools not provided with a stereopticon may arrange for classes, accompanied by their teachers, to come to the Botanic Garden for lectures either by the teacher or by a member of the Garden Staff.

(*b*) Notice of such a visit should be sent at least *one week* previous to the date on which a talk is desired. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Spring and fall announcements of topics will be issued during 1923.

(*c*) The Garden equipment, including greenhouse, plant material, lecture room, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance with the Curator of Elementary Instruction, so that such work will not conflict with other classes and lectures.

(*d*) The principal of any elementary or high school in Brooklyn may arrange also for a series of six lessons on plant culture to be given during the fall or spring to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher. Adapted for pupils above the fourth grade.

C. School and Home Gardening.—In order to encourage gardening in the school and at home, an annual Children's Garden Exhibit is held at the Garden in September. Prizes for excellence in various subjects are awarded to both schools and individuals. The privilege of competition at this exhibition is open to any school and also to any boy or girl in Brooklyn, even though the garden products exhibited may have been raised at his summer home. A leaflet describing in detail the conditions for the exhibit and the prizes offered will be mailed on request.

The exhibit for 1923 will be held on *Friday* and *Saturday, September 28* and *29*. All exhibits, of schools as well as of individuals, must be brought to the Brooklyn Botanic Garden before 12 o'clock, *Friday, September 28*. The exhibit will be judged at 1 o'clock on that afternoon, and will be open for public schools at 2 p.m., Friday, when classes are invited to come with their teachers. The exhibit will be open to the general public on Friday afternoon and on Saturday from 10 to 4. After 4 o'clock on Saturday afternoon the exhibitors may remove their exhibits. Prizes will be presented on Saturday afternoon, *October 13*, at 2:30 o'clock.

D. Penny Packets of Seeds.—In order to assist the above work, penny packets of seeds are put up by the Botanic Garden for children's use. In the early spring, lists of these seeds, conditions for entry as an exhibitor, and other information may be secured on application to the Curator of Elementary Instruction.

E. Conferences.—Conferences may be arranged by teachers and

principals for the discussion of problems in connection with gardening and nature-study. The first Monday afternoon of each month will be reserved for such conferences: appointments must be made in advance. Address Miss Ellen Eddy Shaw.

F. Study and Loan Material.—On request, the Garden will endeavor to provide living seedlings or plant parts for study, to the extent of its facilities. Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden. Petri dishes, which must be cleaned and delivered to the Garden, will, on request, be filled with nutrient agar, ready for exposure in the study of bacteria and molds. In all cases arrangements must be made by teachers for calling for such material, and all material loaned by the Garden must be returned promptly in good condition.

During the fall and spring the Botanic Garden will be able to arrange for a limited number of loan exhibits to public schools of living and herbarium material of spring wild flowers and weeds and of fall wild flowers and weeds. Applications should be sent to the Curator of Elementary Instruction one week before the exhibit is desired. Three sets of lantern slides have been prepared for loan on the following subjects:

1. Plant Life
2. Spring Wild Flowers
3. Common Trees

II. PUBLIC LECTURES

Spring Lectures

Fridays at 4: April 6–27

1. April 6. *Evolution.* C. Stuart Gager, Director, Brooklyn Botanic Garden.

2. April 13. *Trees in Nature and Art.* A. F. Blakeslee, Resident Investigator in Plant Genetics, Station for Experimental Evolution, Cold Spring Harbor, L. I.

3. April 20. *Forestry in the United States.* Henry Solon Graves, Dean, School of Forestry, Yale University.

4. April 27. *What's New in the Garden.* Edward I. Farrington, Editor of *Horticulture,* Boston, Mass.

Fall Lectures

Fridays at 4: October 5–November 2 (omitting October 12)

1. October 5. *Ten Years of Garden Work with Brooklyn Boys and Girls.* Ellen Eddy Shaw, Curator of Elementary Instruction, Brooklyn Botanic Garden.

2. October 19. *Bulbs and Their Allies.* Hugh Findlay, Assistant Professor of Agriculture, Columbia University.

3. October 26. *The Evolution of Flowers.* Alfred Gundersen, Associate Curator of Plants, Brooklyn Botanic Garden.

4. November 2. *The Life of the Plant.* Arthur Harmount Graves, Curator of Public Instruction, Brooklyn Botanic Garden.

III. COURSES OF INSTRUCTION

A. Children's Gardens: Nature Study

1. *Courses for Children*

The following courses are open to all boys and girls. Enrolment in these courses entitles the boy or girl to membership in the Boys' and Girls' Club of the Brooklyn Botanic Garden. This club, having an active membership of nearly 1,000, meets four times a year for discussion of subjects related to plant life. Papers on various botanical subjects are read at these meetings, and the speakers are then entitled to a silver pin, providing they have taken courses of study at the Garden extending over at least six months. For announcement concerning Children's Room see page 19.

A1. The Beginners' Garden.—Open annually to 50 boys and girls who have never had instruction in gardening at the Brooklyn Botanic Garden. This course takes up the subject of the small garden, what to plant, how to plant it, care, replanting, etc. *Application for plots should be made in person or in writing before March 1.* Size of plots 8 ft. by 10 ft. All crops belong to the individual. *Fee, twenty-five cents. Saturday* mornings, 9–12, *April 21 to October 6.* Miss Sanders.

A2. Second Year Gardens.—Open to 50 boys and girls who have had one or more seasons at the Brooklyn Botanic Garden—a continuation of Course A1. Registration should be made before September 1 of each year for the following year. *Fee, twenty-five cents. Saturday* mornings, 9–12. *April 21 to October 6.*

Miss Hickok.

A3. Junior Garden Assistants.—Open to older boys and girls, or to those who have mastered Courses A1 and A2. Size of plot 10 ft. by 20 ft. *Fee, fifty cents.* These gardens are for the raising of vegetables. The work is in the nature of a project, "How much can one raise on a plot 10 ft. by 20 ft.?" Hours to be arranged. The student must put in at least two periods a week during the summer vacation, and, if possible, three. Registration date: *April 21.* Miss Hammond.

A4. Preparation for the Outdoor Garden.—The following classes are open to boys and girls during the spring of each year. The courses are planned for a better understanding of plant life and so that the outdoor garden may become a more intelligent piece of work. Classes are limited to fifteen. The *fee* for each course is *fifteen cents* to cover the cost of material.

Boys' Spring Course.—(*a*) *Saturday* mornings, 9–10:15, *February 10 to March 31.* (*b*) *Saturday* mornings, 10:30–11:30, *February 10 to March 31.*

Girls' Spring Course.—(*a*) *Saturday* mornings, 9–10:15, *February 10 to March 31.* (*b*) *Saturday* mornings, 10:30–11:30, *February 10 to March 31.* Miss Sanders, Miss Hickok.

A5. Advanced Work for Older Boys and Girls.—How to raise plants, mix soils, transplant, start seedlings for outdoor gardens, etc. Boys and girls who have taken spring courses under A4 are eligible for advanced work. The *fee* for the course is *twenty-five cents.* Each student may take home his plants and seedlings. This course is open to both boys and girls over twelve years of age. *Saturday* mornings at 9:30, *February 10 to March 31.*

Miss Hammond.

A6. Advanced Nature Work.—A course designed for those older boys and girls who have taken Courses A1–A5. Plant collections will be made and the simpler principles of plant classification

studied. Projects will be assigned to individuals. *Open only to pupil assistants of the Garden.* Hours to be arranged.

Miss Shaw.

A7. Fall Greenhouse Work.—The following courses are self-explanatory and are for both beginners and advanced students:

Class A.—Open to boys and girls who have been in at least two fall bulb classes before this. This class is for advanced work. The bulbs used will be hyacinth, tulip, narcissus, oxalis. Geranium cuttings and primroses will also be used. Time of class, 10:30, *Saturday* mornings. *Fee, fifteen cents. October 20 to December 1.* Miss Sanders.

Class B.—Open to boys and girls who have never taken any greenhouse work before. Bulbs used: narcissus, oxalis, primrose; also geranium cuttings. *Saturday* mornings at 9:15. *Fee, fifteen cents. October 20 to December 1.* Miss Hickok.

Class C.—Open to boys and girls over thirteen years of age. Subjects studied: hyacinth, Easter lily, calla lily, the botany of common cultivated plants, etc. *Fee, twenty-five cents. Saturday* mornings at 10, *October 20 to December 1.* Miss Hammond.

Class D.—Open to any boy or girl. Subject: the making of garden Christmas presents. There will be a choice of gifts. Some of the articles made will be the following: a basket, seed packet, flower book-mark, painted pot and plant to go in it, calendar, pot of sweet peas, wooden box with flower design, one article made in the woodwork shop. *Saturday* mornings at 10:30. *Fee, twenty-five cents. October 20 to December 1.*

Miss Sanders, Miss Hickok.

A8. Junior Gardeners' Course.—A course for boys 14–17 years of age. Lessons given in the care of border and other flower beds, in the weeding and care of small vegetable gardens, in mowing and watering lawns, repotting plants, etc. This is planned to fit boys for summer work and to enable them to obtain positions. Hours to be arranged. *Fee, fifty cents.* Practical work with the gardeners and foreman, under the supervision of Miss Hammond.

A9. Nature Study for Boy Scouts, Girl Scouts, Camp Fire Girls, Scout Leaders, and Others.—Short courses of at least four periods each, with talks, demonstrations, and field trips in the grounds of

the Botanic Garden and Prospect Park to study trees, shrubs, etc. The instruction will be adapted to meet the needs of the various groups that apply. *Open only to groups of at least ten persons.* Hours to be arranged. Dr. Graves, Miss Hammond, and assistants.

A10. Special Work for High-School Pupils.—A course in gardening or greenhouse work adapted for high-school pupils. Classes to be arranged for by the high-school teacher. Miss Shaw.

2. *Courses for Teachers*

The following brief courses are designed primarily for teachers who wish to gain some knowledge of nature study and gardening for use in their school work, without taking the longer courses described under B, page 8. It should be noted that only the latter courses are accepted by the Board of Education for teachers' credits.

A21. Greenhouse Work for Teachers.—Do you wish to learn how to raise plants for the school garden or your own garden? This course is a practical one and almost the entire work is done in the greenhouses. All of the seedlings raised belong to the student. *Open to beginners only.* Students who have taken this course, and who wish to continue the work, although not admitted to the class, may arrange for an assignment of space in the greenhouse. Five lessons. *A fee of one dollar* will be charged to cover cost of materials. *Tuesdays,* 4 p.m., *February 27 to March 27.* Miss Shaw, Miss Hickok.

A22. The School Garden.—A series of four practical lessons and demonstrations on the school garden; how to lay it off, plant it, kinds of seeds to use, school garden management, etc. *Fee, fifty cents,* to cover cost of materials. *Tuesdays,* 4 p.m., *March and April.* (Not offered in 1923.) Miss Shaw.

A23. Spring Nature Study for the Classroom.—This course of three lessons will acquaint the teacher with common nature-study material which may be taken into the classroom during the springtime. Demonstration materials will be given to members of this class. The work will be based on the syllabus of nature study for the schools of New York City and will be entirely practical. *No fee will be charged* for this course. *Wednesdays,* 4 p.m., *May 9–23.* Miss Hammond.

A24. Fall Garden Work.—Three lessons on home plants; window boxes; indoor planting of bulbs; the outdoor bulb bed. *Fee, one dollar. Tuesdays,* 4 p.m., *October 2–16.*

Miss Shaw, Miss Sanders.

A25. Fall Nature Study.—This course is a complement to the spring nature-study work and the material used will be the common material one would use in classroom work, showing seed dispersal, evergreens, deciduous trees, etc. Such subjects as Nature's preparation for winter will be covered. Three lessons. *Mondays,* 4 p.m., *October 15–29.* Miss Hammond.

B. Courses for Teachers of Children's Gardening and Nature Study

The course for teachers in children's garden work is planned not only to prepare for garden work, but for the teaching of nature study as well. Our courses are so arranged that they emphasize not only the theory of each subject, but its actual practice, either in classroom, greenhouse, garden, or field. At the same time the work is correlated to meet the needs of each grade of the elementary school. There is an increasing demand for good nature study work in our schools, and we make a special point of giving simple, definite, helpful work, grading it so that it applies directly to the immediate needs of our own city schools. Practice with classes of children of different ages is given in all this work. The requirements for entrance are a certificate from a city training or normal school, a college diploma, or several years of certified successful teaching. These courses may be completed during one year, or, as in the case of city school teachers, may extend over a period of two or more years. The *fee for the entire course is twenty-five dollars,* payable in full at the time of registration, or course by course as they are covered. No money will be refunded if the student drops the work, and no monetary allowances will be made for courses taken at other institutions, although time allowances will be made.

Special stress is put upon the outdoor garden practice. This practice is of two kinds: (1) Practice with children. There are one hundred and fifty children in our outdoor garden, and every

opportunity is given for the student to become accustomed to handling children and for working out problems connected with this phase of the work. (2) Practice in the teacher's garden. Each student has a garden of her own and works it herself, thus performing all gardening operations to be taught later to children.

To those who satisfactorily complete this course a certificate will be given. *The courses offered in children's gardening are considered as a unit.*

These courses have been accepted by the Board of Education for teachers' credits as follows:

1. Any of the courses will be accepted toward meeting clause "b" of the conditions of eligibility for high school license in Biology.

2. The course in Pedagogy of Botany and Educational Principles of Children's Gardening (**B4**) will be accepted as a satisfactory 30-hour course in Pedagogy toward meeting the requirement of 60 hours' work in Pedagogy in lieu of the written test in Principles and Methods of Teaching for Promotion License.

3. This course will be accepted as a pedagogical course, and either of the other four courses will be accepted as an academic course toward meeting the conditions of exemption from the academic paper in the examination for license as assistant to principal. Such exemption is granted to those who offer 120 hours of satisfactory work, 60 of which must be in the Science of Education and 60 in some branch of literature, science or art, such 120 hours' work not being accomplished wholly within one academic year.

These courses have been accepted by the Brooklyn Teachers' Association and appear in the syllabus of courses.

The individual student may apply at any college for credits on these courses, which will be granted according to individual merit.

B1. General Botany.—Thirty sessions. A course designed to make clear the fundamental morphological and physiological principles of botany. With a view to correlation with the other courses described below, emphasis is laid upon the higher plants, particularly their classification and physiology, and in connection with the latter subject a consideration of plant diseases from a practical as

well as theoretical viewpoint is also included. *Fee, five dollars. Thursdays,* 4 p.m., beginning *September 27.* Dr. Graves.

B2. Nature Study.—Thirty sessions. This course covers the plant material used in nature study teaching, and includes the identification of the common trees, shrubs, plants, wild flowers, and weeds. Mounts, charts, and diagrams are made. The student becomes familiar with the actual material. The course is entirely practical, work being done in both field and laboratory. Two hours of such work are weighted as one hour. *Fee, five dollars. Tuesdays,* 4 p.m., beginning *September 25.*

Miss Hammond.

B3. Principles of Agriculture and Horticulture.—Thirty sessions. This course will be especially helpful to teachers. The principles of horticulture are considered and applied in a practical way through greenhouse, laboratory, and lecture work. The greenhouse work includes the following subjects: plant propagation by means of bulbs, rhizomes, roots, seeds, etc.; the care of the greenhouse; home plants; window-box materials; fertilizers. Insect and fungous pests, grafting and pruning are also included from both a practical and a theoretical point of view. *Fee, five dollars. Wednesdays,* 4 p.m., beginning *September 26.*

Miss Shaw and Mr. Free.

B4. Pedagogy of Botany and Educational Principles of Children's Gardening and Nature Study.—Thirty sessions. Discussion of the mental processes involved in learning and in teaching science and the fundamental principles which underlie and point the way to laboratory and field work. After this a course of study in gardening and nature study, based on the school syllabus, is worked out and the basic psychological and pedagogical principles discussed. This course includes all the modern phases of the subject and is so arranged that it may be taken directly into classroom work. Gardening as a factor in the work of Americanization is the keynote. *Fee, five dollars. Thursdays,* 4 p.m., beginning *September 27.* Dr. Gager and Miss Shaw.

B5. Garden Practice.—Thirty sessions. This course is entirely practical and includes all the outdoor work of the student in his own garden, applying the principles of agriculture and gardening,

work with children in the garden, basketry and woodwork. Three hours of outdoor practice count as one credit hour. Ninety hours is the minimum in this course, but students may profitably put in a greater number of hours to the maximum of 630 hours, or seven credits. *Fee, five dollars. Saturdays,* 10 a.m., beginning *September 29.* Miss Shaw.

C. Courses for the General Public

The following courses are open to every one who has a general interest in plants. Teachers are welcome. They are *free to those enrolled as members of the Botanic Garden;** for others a small fee is required, as specified. Registration should be made with the instructor in person or by mail at least one week before the course opens, in order that adequate material, etc., may be provided. *No course will be given when less than six apply.*

1. *Spring Courses*

C1. Plants in the Home.—How to grow them. Five talks with demonstrations. Practice in potting, mixing soils, making cuttings, etc. This course deals with the principles to be followed in raising plants. The members of the class have the privilege of keeping the plants they have raised. *Fee, one dollar. February and March.* (Not offered in 1923.) Mr. Free.

C3. The Flower Garden.—Making the most of it. Five lessons. How to improve soils and get results from planting; old-fashioned flowers; annuals; summer bedding; vines for screening unsightly objects; rose culture; growing of ornamental shrubs; pruning; how to make a lawn and keep it up. *Fee, one dollar. Thursdays,* 4 p.m., *March 1–29.* Mr. Free.

C7. Evolution and Classification of Plants.—Six illustrated lectures; the first three outlining the probable development of the plant kingdom through the ages of the earth's history, the last three devoted to the relationships of the different families of flowering plants. The lectures will be supplemented by trips to the conservatories. *Fee, one dollar. Fridays,* 4 p.m., *February 16 to March 23.* Dr. Graves and Dr. Gundersen.

*For information concerning the conditions of membership in the Brooklyn Botanic Garden consult the third page of the cover of this Prospectus.

C8. Spring Flowers and Ferns.—Eight outdoor lessons in the Botanic Garden, taking up the identification of plants and the characters of plant families. A hand lens is desirable. This course is offered as a complement to Course C7. *Fee, $1.50. Fridays,* 4 p.m., *May 4 to June 22.* Dr. Gundersen.

C9. Trees and Shrubs of Brooklyn and Vicinity.—Ten outdoor lessons at the Garden and elsewhere in Greater New York, the principal object being to gain a ready acquaintance with the common trees and shrubs of the eastern United States, which are well represented in this region. The species are considered in systematic order, and the features pointed out by which they may be most easily recognized; also their habits, rate of growth, economic value and use, methods of planting and propagation; importance in forestry, horticulture, or landscape art. *Limited to 50 members enrolled in the order of application. Fee, two dollars. Saturdays,* 2:30 p.m., *April 7 to June 9.* Dr. Graves.

2. Fall Courses

C4. Gardening in the Fall.—Six lessons, with practical work in the greenhouse, on the methods of making cuttings, the various kinds of bulbs for fall planting, their treatment and care, the proper management of house plants and a discussion of the kinds suitable for cultivation. *On account of restricted space in the greenhouse, this class must be limited to 20. Registration according to the order of application. Fee, one dollar. Thursdays,* 4 p.m., *September 27 to November 1.* Mr. Free.

C5. Trees and Shrubs in their Winter Condition.—Six outdoor lessons in the Botanic Garden and Prospect Park on the characteristics of our common trees and shrubs, both native and cultivated, emphasizing their distinguishing features in the winter condition. *Fee, one dollar. Wednesdays,* 4 p.m., *October 3 to November 7.* Dr. Graves.

C6. Fall Flowers and Fruits.—Six outdoor lessons, chiefly in the Botanic Garden. The distinguishing features of the more common kinds of native and cultivated fall flowers and fruits are studied, as well as the different types of fruits. *Fee, one dollar. Tuesdays,* 4 p.m., *September 25 to October 30.* Dr. Gundersen.

D. Course for the Training of Gardeners

The following course for the training of gardeners is planned to meet the needs of students of the Federal Board for Vocational Education, but is open to all who meet the necessary requirements.

Requirements:

Age.—At least 18.

Personality.—To be satisfactory to Botanic Garden authorities.

Education.—Schooling through at least the first two years of high school, or its equivalent in experience and general intelligence, to be decided by personal conference.

Enrolment.—Students may, for the present, enter the course at any time.

Continuation.—Students who give evidence that they are not likely to succeed in gardening will not be allowed to continue the course.

Vacations.—Four weeks distributed throughout the year.

First Year

First Quarter

1. **Garden and Greenhouse Practice.**—Five days a week; hours 9–12, 1–2:30.

Care of tools, care of cold frames, making a hotbed, seed sowing, transplanting, lawn making, hoeing and cultivating, spraying for insect and fungous pests, watering, winter protection of plants, manuring, harvesting and storing, staking and tying, supports for climbing plants, pruning, and repair of trees, propagation by seeds, cuttings, layers, budding and grafting; care of rock garden, perennial garden, bedding plants, aquatic garden, wild garden; making up window boxes and hanging baskets; transplanting trees and shrubs, etc.

Greenhouse.—Watering, ventilating, shading, cleaning plants of insect pests, potting, heating, practice with special crops, orchids (planting and general care); chrysanthemums (potting and general care); ferns, palms, *Primula, Cyclamen,* etc.

2a. **Elementary Botany.**—Plant structure and function. Twice a week.

3. **Soils and Fertilizers.**—Once a week.

4. **Inspection of the Plantations and Plant Houses Under Guidance.**—Study of plant materials. Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

Second Quarter

1. **Garden and Greenhouse Practice** (continued).

2a. **Elementary Botany.**—Plant structure and function (continued). Once a week.

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

7a. **Animal Friends and Foes in the Garden.**—Once a week.

8a. **Fungous Diseases of Plants.**—Once a week.

Third Quarter

1. **Garden and Greenhouse Practice** (continued).

2b. **Elementary Botany.**—Classification, identification of plants. Once a week.

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

9. **Principles of Horticulture.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

11. **Plant Relations.**—Once a week for six weeks.

Fourth Quarter

1. **Garden and Greenhouse Practice** (continued).

2b. **Elementary Botany.**—Classification, identification of plants (continued). Once a week.

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a week.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

9. **Principles of Horticulture.**—Once a week.

10. **Trips to Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

12. **Garden Carpentry.**—Once a week.

Second Year

First Quarter

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

10. **Trips to Horticultural Exhibits, Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

13. **Garden Planning.**—Once a week.

14. **Floriculture.**—Once a week.

15. **Vegetable Growing.**—Once a week.

16. **Floral Decoration.**—Once a month.

Second Quarter

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

8b. **Fungous Diseases of Plants.**—Advanced course. Once a week for six weeks.

10. **Trips to Horticultural Exhibits, Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

14. **Floriculture** (continued).—Once a week.

15. **Vegetable Growing** (continued).—Once a week.

16. **Floral Decoration.**—Once a month.

17. **Plant Breeding.**—Once a week for six weeks.

Third Quarter

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

7b. **Animal Friends and Foes in the Garden.**—Advanced course. Once a week for six weeks.

10. **Trips to Horticultural Exhibits, Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

14. **Floriculture** (continued).—Once a week.

16. **Floral Decoration.**—Once a month.

18. **Types of Gardens.**—Once a week.

19. **Road and Walk Making; Use of Cement in Garden Structures.**

Fourth Quarter

1. **Garden and Greenhouse Practice** (continued).

4. **Inspection of the Plantations and Plant Houses Under Guidance** (continued).—Once a month.

5. **Special Lectures and Conferences.**—Saturdays.

6. **Assigned Readings and Reports.**—Once a week.

10. **Trips to Horticultural Exhibits, Nurseries, Private Places and Other Gardens Under Guidance.**—Once a month.

16. **Floral Decoration** (continued).—Once a month.

20. **Window Boxes, Hanging Baskets, Wardian Cases, etc.**—Once a week for six weeks.

21. **Greenhouse Construction.**—Once a week for six weeks.

22. **Plant Forcing.**—Once a week.

Principles of Pruning.—Once a week for six weeks.

For final certification one year's satisfactory experience will be required, under direction, in an accepted commercial or private garden.

E. Consultation and Independent Investigation

1. *Consultation*

Consultation and advice, and the facilities of the laboratories, library, and herbarium are freely at the service of members of the Botanic Garden and others with special problems relating to plants or plant products, especially in the following subjects:

1. **Plant diseases** (phytopathology) and classification of fungi (mycology). Dr. G. M. Reed.

2. **Plant breeding** and allied subjects (genetics and experimental evolution). Dr. Orland E. White.

3. **Plant geography** (phytogeography) **and ecology.** Mr. Norman Taylor.

4. **Classification and identification of flowering plants** (systematic botany). Dr. A. Gundersen.

5. **The growing of cultivated plants** and their arrangement; also their adaptation to soils, climate, and other factors (horticulture and gardening). Mr. Montague Free.

*2. Investigation**

For the following research courses there is a charge covering all expenses, including laboratory fee, of *$30 for each full course* of 100 credit hours, and *$20 for each half course* of 50 credit hours.

E6. Research in Mycology and Plant Pathology.—Independent investigation of problems relating to fungi and fungous diseases of plants. Dr. Reed.

E7. Research in Plant Genetics.—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics. Offered in the fall of 1922. Dr. White.

E8. Research in Plant Geography and Ecology.—Independent investigation of problems in plant geography and ecology. Mr. Taylor.

E9. Research in Forest Pathology.—Independent investigation of the diseases of woody plants. Dr. Graves.

IV. OTHER EDUCATIONAL FEATURES

Plantations

The plantations comprise several sections, including the local flora (native wild flower garden), general systematic (trees,

* Courses of graduate rank offered by the Botanic Garden, when approved by the Faculty of the Graduate School of New York University, are listed as courses in the Graduate School, and are given the same credit as other graduate courses. Properly qualified students who take these courses may present them in satisfaction of the requirements for advanced degrees given by the University. Graduate credit has also been allowed elsewhere for such advanced work done at the Garden.

shrubs and herbaceous plants not native within 100 miles of Brooklyn), morphological, ecological, economic, and rock gardens, Japanese garden, and children's gardens. As noted below, under *Docentry,* arrangements may be made for viewing the plantations under guidance. They are open free to the public daily from 8 a.m. until dark; on Sundays and holidays from 10 a.m. until dark.

Conservatories

The Garden conservatories contain a collection of tender and tropical plants. Of special interest for teachers of nature study and geography are the following useful plants from the tropics and subtropics: banana, orange, lemon, lime, citron, kumquat, West Indian cedar (the source of the wood used for cigar boxes), eucalyptus, Manila hemp, sisal, pandanus (source of the fiber used for making certain kinds of fiber hats), fig, grape vines from north and south Africa, date palm, cocoanut palm, chocolate tree, coffee, tea, camphor, ginger, sugar cane, avocado (so-called "alligator pear"), West Indian and other rubber plants, banyan, religious fig of India, and numerous others.

The Conservatories are open April 1 to November 1, 10 a.m.–4:30 p.m. (Sundays, 2–4:30); November 1 to April 1, 10 a.m.–4 p.m. (Sundays, 2–4).

Herbarium

The Garden herbarium consists at present of over 180,000 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algae, and myxomycetes. This collection may be consulted from 9 a.m. until 5 p.m. by those interested, and specimens submitted will be gladly identified.

Library

The rapidly growing library of the Garden comprises at present over 8,500 volumes and over 6,000 pamphlets. This is not a circulating library, but is open free for consultation to all persons from 9 a.m. until 5 p.m. (Saturdays, 9 to 12). Over 580 periodical publications devoted to botany and closely related subjects are regularly received.

Children's Room

A gift of $1,500 in 1921 from a friend of the Botanic Garden has made it possible to provide a beautifully decorated room for the use of the Boys' and Girls' Club. Any boy or girl who is enrolled, or has been enrolled, in any of the children's classes at the Garden is eligible for membership in this club, which now numbers about 1,000 active members. The room contains shelves for a nature study library, of which a nucleus has already been secured, and will be equipped with stereoscopic views, photographs, and preserved and living specimens of plant life, for the instruction and entertainment of boys and girls. The room is open free to all children. Contributions of specimens and of books on nature study and closely related subjects will be most welcome.

Docentry

To assist visitors in studying the collections a docent will leave the front door of the laboratory building every Monday, Wednesday, and Friday (weather permitting) at 3 p.m., as per the following schedules:

Spring Schedule

May	Monday	Japanese Garden Wild Flower Garden
	Wednesday	Rock Garden Conservatories
	Friday	Herbaceous and Shrub Garden Ecological Garden
June	Monday	Rock Garden Iris Garden
	Wednesday	Herbaceous and Shrub Garden Ecological Garden
	Friday	Japanese Garden Wild Flower Garden

Fall Schedule

September 15–30...	Monday	Conservatory Garden Rock Garden Ecological Garden
	Wednesday	Japanese Garden Conservatory Garden
	Friday	Children's Garden Conservatory Garden
October.....	Monday	Conservatory Garden Conservatories
	Wednesday	Children's Garden Conservatories
	Friday	Japanese Garden Conservatories

This service is offered to the public without charge. No parties of less than ten adults will be conducted. Children must be accompanied by an adult. *Members of the Botanic Garden, and friends accompanied by members,* may receive docentry service at times other than those specified above. Special arrangement should be made as far in advance as possible with the Curator of Public Instruction.

NOTES

The *Florists Exchange* for October 14, 1922 (page 1030), devotes a column to notes of appreciation of numerous features of the Brooklyn Botanic Garden, calling attention especially to the hardy asters which were in bloom in the garden this fall, to the excellent condition of our Rhododendrons, to the Rock Garden, the Japanese Garden, and the shrub borders. The Japanese Garden is described as "the real thing," and with reference to the Rock Garden the writer says it is "one of the best bits of rock building anywhere around New York; it's a good object lesson, showing what can be done with the native stones, not always of the best."

We have received a copy of the first number of the *Bulletin* of the Cleveland Museum of Natural History, issued November 1, 1922. This is a four-page leaflet which will replace the regular monthly letter heretofore sent to members of the Museum. Of special botanical interest is the note in this *Bulletin* of the gift to the Museum of the herbarium and part of the scientific library of the late Samuel Hart Wright, of Penn Yan, N. Y. This well-known botanical collector was born in 1825 and died in 1905. The herbarium is reported to contain approximately 10,000 specimens, including about half of the known species and varieties and representing 86 per cent. of the genera. About half the genera of European plants are said to be represented in this collection in addition to a large collection of specimens from Brazil, South India, and New Zealand. The library comprises over 600 volumes, most of which, the note states, are out of print.

Dr. A. H. Graves, of the Botanic Garden staff, has been made honorary member of Phi Sigma, the National Honorary Biological Fraternity. Doctor Graves was elected by the Mu Chapter at Washington and Jefferson College. The object of the Fraternity is the encouragement of biological study and research.

On Saturday afternoon, October 14, the prizes won by exhibitors at the Ninth Annual Garden Exhibit were distributed to the successful exhibitors at exercises held in the lecture hall. On Saturday morning, October 21, silver pins were awarded to 14 of the boys and girls who had qualified for this distinction by sustained work in our courses for children. On this occasions the Boys' and Girls' Club presented, for the fifth year, $35 for the support of a French orphan.

Flowers Out of Season.—The unusually prolonged period of warm weather last fall resulted in a number of shrubs and herbaceous plants coming into bloom which ordinarily do not bloom until the spring. Many flower buds opened on the Azaleas during late October and the first part of November. As late as November 24 an almost fully opened flower was picked from one of the Rhododendrons near the lake. As late as the first week in November

about half the flowers on two inflorescences of a Mountain Ash (*Sorbus Aucuparia*) in front of the greenhouses were opened and, as late as November 24, plants of the Grass Pink (*Dianthus plumarius*), Sea Pink (*Armeria vulgaris*), Dogwood (*Prunus tomentosa*), Cornelian Cherry (*Cornus Mas*), and *Forsythia* were in bloom. Several *Forsythia* bushes were noticeably yellow with blossoms on the date mentioned. Also on the same date a shrub of *Spirea Vanhoutei* had nearly all of its leaf-buds open, presenting the appearance that it usually has in early spring, just before flowering. As late as December 2 plants of the heather (a form of *Calluna vulgaris*) were in bloom.

Japanese Garden.—Among numerous improvements made in the Japanese Garden last fall, under the supervision of Miss Mary Averill, our Curator of Japanese Gardening and Floral Art, is the erection of a snow protection over one of the character pines near the center of the garden, and about six feet in height. This device consists of a bamboo pole about twice the height of the tree, with stout cords extending from the top of the pole to the tips of the branches, forming an open pyramidal cap. The strings hang slack, and the intention is that they will reduce the weight of snow on the branches and thus afford a certain amount of protection to the tree, especially in the way of preventing the branches from being permanently bent out of the position into which they have been carefully trained. The device is known as a *Yuki-Yoki.* The Garden has been fortunate this year in securing the services of Mr. J. Shogo Maeda, a Japanese Landscape Architect, formerly with the Department of Forestry and Landscape Gardening in the Faculty of Agriculture, Tokyo Imperial University, Japan. Mr. Maeda was assisted by Mr. M. Ito. Visitors to the Japanese Garden were greatly interested, in the course of the fall work, in the method of the Japanese gardeners in manuring trees and shrubs. In this work the aim is to have no manure in evidence after the work is done, and to secure this the method is to dig a rectangular cavity in the soil a little at one side of the trunk of the tree or center of the shrub, as the case may be. Into this cavity the manure is placed, mixed with a little soil, and then covered over, with the sod (if there was any) carefully replaced. At the close of the

work there is not the slightest evidence of the manuring of the trees and shrubs in the garden. This is an aesthetic refinement to which neither the American nor even English garden, at its highest development, has ever yet attained. All of the fall work, as well as the spring work, in the Japanese Garden last year was made possible through the gift, by a member of the Woman's Auxiliary, of a fund to be used exclusively for that purpose.

Among recent visitors to the Botanic Garden were the following: Dr. G. R. Bisby, University of Winnipeg, Manitoba (October 3); C. A. Weatherby, East Hartford, Conn., Editor, American Fern Journal (October 13); Mr. G. F. Gravatt, U. S. Department of Agriculture, Washington, D. C. (October 16); Dr. Seiya Ito, Hokkaido Imperial University, Sapporo, Japan (October 20); Prof. F. A. McClure, Canton Christian College, Canton, China (October 30); Miss Margaret Deer and Miss Nell Deer, Teachers College, Sydney, New South Wales, Australia (October 30); Mr. Edgar Nelson, Department of Immunology, Society of the New York Hospital, Flushing, L. I. (October 31); Mr. Wm. T. Davis, St. George, S. I. (November 9); Mrs. S. L. Kwong, Kwongtung Agr. Exp. Sta., Canton, China (December 1); and Dr. Wm. T. Bovie, Department of Biophysics, Harvard University (December 5).

A New Botanic Garden.—During August, 1922, Mr. James H. Ferriss and Mr. Pilcher, Commissioners from Joliet, Illinois, visited the Garden in quest of information to be used in the organization and development of a new botanic garden and arboretum at Joliet. It will start with a nucleus of 327 acres, on which, according to Mr. Willard N. Clute, Commissioner in Charge of Grounds, there has been planted "practically every tree in America that will stand our climate and these trees have been growing for nearly 20 years." It is planned ultimately to enlarge this area by the addition of considerable park acreage. Messrs. Ferriss and Pilcher were keenly interested in the general plan of the Brooklyn Botanic Garden and in its work—particularly the educational features, which they expect to introduce in the new institution at Joliet.

The Brooklyn Institute of Arts and Sciences

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GENERAL INFORMATION

MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dark. On Sundays and Holidays at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 978 Washington Avenue, opposite Montgomery Street.

A DOCENT will conduct parties through the plantations and conservatories. For schedule of regular trips consult the annual *Prospectus*. No trips will be taken with parties of less than ten adults. Children must be accompanied by an adult. *Members of the Botanic Garden* may make special advance arrangements for themselves and friends with the Curator of Public Instruction for trips at other times.

TO REACH THE GARDEN take Broadway (B.R.T.) Subway to Prospect Park station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the directors and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly. Volume I, *Dedication Papers:* comprising scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. Price $3.50, plus postage.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

17. *Endophyllum-like rusts of Porto Rico.* 9 pages, 3 plates. 1917.

18. *Inheritance of endosperm color in maize.* 11 pages. 1917.

19. *Studies in inheritance in Pisum. II. The present state of knowledge of heredity and variation in peas.* 102 pages. 1917.

20. *Inheritance studies in Pisum. III. The inheritance of height in peas.* 7 pages, fig. 1. 1918.

21. *A sketch of plant classification from Theophrastus to the present.* 16 pages. 1918.

22. *A basis for reconstructing botanical education.* 6 pages. 1919.

23. *Plant families: a plea for an international sequence.* 9 pages. 1920.

24. *Plants and animals of Mount Marcy, New York.* 69 pages, 1 plate, 22 figs. 1920.

25. *Endemism in the Bahama flora.* 10 pages, fig. 1, 1921.

26. *Plant composition and soil acidity of a Maine bog.* 4 pages, 1921.

27. *The origin of new varieties of Nephrolepis by orthogenetic saltation. II. Regressive variation or reversion from the primary and secondary sports of Bostoniensis.* 18 pages, 6 plates. 1922.

28. *Botanical exploration in Bolivia.* 13 pages. 1922.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $6.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $3.00 a year.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year.

LIBRARY
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BROOKLYN BOTANIC GARDEN RECORD

VOL. XII APRIL, 1923 NO. 2

TWELFTH ANNUAL REPORT

OF THE

BROOKLYN BOTANIC GARDEN

1922

"The cultivation of science in its highest expression is perhaps even more necessary to the moral condition than to the material prosperity of a nation... Science should be the highest personification of nationality because, of all the nations, that one will be foremost which shall be first to progress by the labours of thought and of intelligence." *Pasteur.*

FOR THE ADVANCEMENT OF BOTANY AND THE SERVICE OF THE CITY

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AT LANCASTER, PA.
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BROOKLYN, N. Y.

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BOTANIC GARDEN STAFF

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MISS PHILURA H. BROWER, *Secretary*

MR. FRANK STOLL, *Registrar and Custodian of Buildings*

MR. LOUIS BUHLE, *Photographer*

MR. HERMAN KOLSH, *Foreman*

EDUCATIONAL INSTITUTIONS AND OTHER ORGANIZATIONS WITH WHICH THE BROOKLYN BOTANIC GARDEN HAS COOPERATED DURING 1922

Municipal Departments and Institutions

Bellevue and Allied Hospitals
College of the City of New York (Manhattan)
Department of Education, New York City
- Brooklyn Model School
- Continuation School, Brooklyn
- Director of School Gardens
- High Schools and Annexes
  - Brooklyn (18, or 100%) Manhattan (2)
  - Queens (1) Richmond (1)
  - Junior High Schools, Brooklyn (11, or 91%)
- Jamaica Training School for Teachers
- Maxwell Training School for Teachers (Brooklyn)
- New York Training School for Teachers (Manhattan)
- Opportunity School for Boys (P.S. 90), Brooklyn
- Public Schools
  - Brooklyn (175, or 94%) Queens (10) Bronx (4)
  - Manhattan (10) Richmond (1)
- Vocational School for Boys, Brooklyn
  - Annex of same

Department of Health
Department of Parks
- Brooklyn, Manhattan, Queens

Department of Water Supply, Gas, and Electricity
Hunter College (Manhattan)
Kings County Hospital

Total departments, 8. Total institutions, 251.

Other Free Public Institutions, New York City

Manhattan
- American Museum of Natural History
- Metropolitan Museum of Art

New York Public Library
Library School
New York Zoological Society (Zoological Park)

Brooklyn

Brooklyn Museum
Brooklyn Public Library
Branch Libraries (30)
Children's Museum
Long Island Historical Society Library

Bronx

New York Botanical Garden
New York Zoological Park

Richmond

Public Museum, New Brighton

Total institutions, 41.

Other Institutions and Organizations in Greater New York

Adelphi College
Boy Scouts
Brooklyn Home for Aged Men and Aged Couples
Brooklyn Home for Children
Brooklyn Institute Department of Botany
Brooklyn Teachers Association
Brooklyn Training School for Girls
Campfire Girls
Columbia University
Columbia College
Teachers College
Congregational Home for the Aged
Daughters of the Revolution
Froebel League (Manhattan)
Girl Scouts
Merchants Associations (Manhattan)
Mineola Home for Cardiac Children
Miscellaneous (7)
Montessori Training School (Manhattan)
National Kindergarten Association
National Plant, Flower, and Fruit Guild
New York Academy of Medicine
New York Academy of Sciences
New York University
Orphan Asylum, Sterling Place (Brooklyn)
Packer Collegiate Institute
Parochial Schools, Brooklyn (5)

Pratt Institute
Private Elementary Schools, Brooklyn (9)
Prospect Heights & Brooklyn Maternity Hospital
St. Christopher's Hospital for Babies
St. Giles Hospital for Crippled Children
School Art League
School Garden Association of New York
School Nature League
Staten Island Horticultural Society
Torrey Botanical Club
Woodcraft League

Total institutions, 54.

Institutions Outside of New York City

Domestic

American Fern Society
American Iris Society
American Phytopathological Society
Botanic Gardens, Seed Exchange (5)
Botanical Society of America
Bureau of Vocational Information
Cornell University
Daughters of the Revolution
Ecological Society of America
Garden Clubs (5)
Harvard University (Bussey Institution)
Joliet (Ill.) Botanic Garden and Arboretum
Kindergarten Association, Bristol, Conn.
Miscellaneous Institutions, Exchange of Publications (82)
Miscellaneous organizations (18)
National Commission of the Fine Arts, Washington, D. C.
(Re National Botanical Garden and Arboretum)
National Council of Nature Supervisors and Teachers
National Nature Study Association
National Research Council
National School Garden Association
New Paltz State Normal School
Northern Nut Growers Association
Pennsylvania School of Horticulture for Women
Smith College
U. S. Department of Agriculture
U. S. National Museum (Herbarium)
U. S. Veterans Bureau
University of Illinois, Department of Botany

University of Montana, Department of Botany
Vassar College

Total institutions, 136.

Foreign

Botanic Gardens, Seed Exchange (59)
Canton Christian College
Miscellaneous Institutions, Exchange of Publications (99)

Total institutions, 159.

Grand Total, Institutions and Organizations, 641.

THE BOTANIC GARDEN AND THE CITY

THE BROOKLYN BOTANIC GARDEN, established in 1910, is a Department of the Brooklyn Institute of Arts and Sciences. It is supported in part by municipal appropriations, and in part by private funds, including income from endowment, membership dues, and special contributions. Its articulation with the City is through the Department of Parks.

The City owns the land devoted to Garden purposes, builds, lights, and heats the buildings, and keeps them in repair, and includes in its annual tax budget an appropriation for maintenance. One third of the cost of the present buildings was met from private funds.

Appointments to all positions are made by the director of the Garden, with the approval of the Botanic Garden Governing Committee, and all authorized expenditures for maintenance are made in the name of the private organization, from funds advanced by the Institute, which in turn, is reimbursed from time to time by the City, within the limits, and according to the terms, of the annual appropriation.

All plants have been purchased with private funds since the Garden was established. In addition to this, it has been the practice of the garden to purchase all books for the library, all specimens for the herbarium, all lantern slides, and numerous other items, and to pay certain salaries, with private funds.

The needs of the Garden for private funds for all purposes are more than twice as great as the present income from endowment, membership dues, and special contributions. The director of the Garden will be glad to give full information as to possible uses of such funds to any who may be interested.*

* A written *Agreement,* dated August 17, 1914, between the City of New York and the Institute, touching the Botanic Garden, published in full in the *Brooklyn Botanic Garden Record,* for April, 1915, amends the agreement of September 9, 1912, which amends the original agreement of September 28, 1909, published in the *Record* for January, 1912.

INFORMATION CONCERNING MEMBERSHIP

The Brooklyn Institute of Arts and Sciences is organized in four main departments: 1. The Department of Education. 2. The Museums. 3. The Botanic Garden. 4. The Biological Laboratory.

Any of the following seven classes of membership may be taken out through the Botanic Garden:

1. Annual member	$ 10
2. Sustaining member	25
3. Life member	500
4. Permanent member	2,500
5. Donor	10,000
6. Patron	25,000
7. Benefactor	100,000

Sustaining members are annual members with full privileges in Deparaments one to three. Membership in classes two to seven carries full privileges in Departments one to three.

In addition to opportunities afforded to members of the Botanic Garden for public service through cooperating in its development, and helping to further its aims to advance and diffuse a knowledge and love of plants, to help preserve our native wild flowers, and to afford additional and much needed educational advantages in Brooklyn and Greater New York, members may also enjoy the privileges indicated on the following page.

Further information concerning membership may be had by addressing The Director, Brooklyn Botanic Garden, Brooklyn, N. Y., or by personal conference by appointment. Telephone, 6173 Prospect.

PRIVILEGES OF MEMBERSHIP

1. Free admission to the buildings and grounds at all times.
2. Cards of admission for self and friends to all exhibitions and openings preceding the admission of the general public, and to receptions.
3. Services of docent (by appointment), for self and party, when visiting the Garden.
4. Admission to all lectures and classes under Garden auspices, at the Garden or elsewhere.
5. Special lectures and classes for the children of members.
6. Copies of Garden publications, as follows:

    a. Record
    b. Guides
    c. Leaflets
    d. Contributions

7. Privileges of the Library and Herbarium.
8. Expert advice on the choice and care of plants, indoors and out, on planting the home grounds, the care of lawns, and the treatment of plants affected by insect and fungous pests.
9. Identification of botanical specimens.
10. Admission to all field trips, and other scientific meetings under Garden auspices.

FORMS OF BEQUEST TO THE BROOKLYN BOTANIC GARDEN

Form of Bequest for General Purposes

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which said sum to be used for the educational and scientific work of the Brooklyn Botanic Garden.

Form of Bequest for a Curatorship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, as an endowment for a curatorship in the Brooklyn Botanic Garden, the income from which sum is to be used each year towards the payment of the salary of a curator in said Botanic Garden, to be known as the (here may be inserted the name of the donor or other person) curatorship.

Form of Bequest for a Fellowship

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, the income from which sum is to be used in the payment of a fellowship for advanced botanical investigation in the Brooklyn Botanic Garden, to be known as the .....fellowship.

Form of Bequest for other particular purposes designated by the testator

I hereby give, devise, and bequeath to The Brooklyn Institute of Arts and Sciences, Brooklyn, N. Y., the sum of.....Dollars, to be used (or the income from which to be used) for the Brooklyn Botanic Garden*

.....

.....

*The following additional purposes are suggested for which endowment is needed.

1. The beautifying of the grounds.
2. The purchase of publications for the library.
3. Publishing the results of botanical investigations.
4. Popular botanical publication.
5. The endowment of a lectureship, or a lecture course.
6. Botanical illustration for publications and lectures.
7. The purchase or collecting of plants.

TWELFTH ANNUAL REPORT

OF THE

BROOKLYN BOTANIC GARDEN

1922

FIG. 1. View from the Tsukimido (moon-view house) of the Japanese Garden, showing the drum bridge, one of the stone lanterns (Yukimi), the storks, and the laboratory building in the distance.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. XII April, 1923 No. 2

TWELFTH ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN, 1922

REPORT OF THE DIRECTOR

TO THE GOVERNING COMMITTEE OF THE BOTANIC GARDEN:

I have the honor to present herewith the Twelfth annual report of the Brooklyn Botanic Garden, covering the calendar year 1922.

Finances

The financial situation confronting the Brooklyn Botanic Garden at the close of 1922 is so serious as to merit attention in the opening paragraphs of this report. In brief, the situation is as follows.

By terms of the *Agreement* of August 17, 1914, between the City of New York and the Brooklyn Institute of Arts and Sciences concerning the Botanic Garden, the City agreed to make annual appropriations in its tax budget of such sums of money as it might deem necessary for the proper maintenance of the Garden, and the Garden was authorized to expend these annual appropriations for the care and maintenance of its grounds, buildings, apparatus, library and collections, including the salaries and wages of those required properly to care for and maintain the Garden, its equipment and collections, for furnishing books, for publications relating to botany, and for numerous other purposes set forth in detail in article six of the *Agreement*.

The condition necessary to insure these annual appropriations was that the Garden authorities should provide by private subscription the sum of Fifty Thousand Dollars, "the principal of which sum, or the income thereof" to be used for "the purchase of plants, flowers, shrubs and trees." This *Agreement* was amended on September 9, 1911 so as to provide, among other things, that the private funds might be expended for Botanic Garden purposes other than those specifically named in the original *Agreement*. The initial private funds were contributed with the understanding on the part of the donors that they were to constitute a permanent fund of which only the income was to be expended.

The immediate response on the part of the local community and of the botanical world to the opportunities afforded by the new Garden left no doubt of the fact that it met a real need, but subsequent events showed that, from the financial point of view, there could not have been chosen, since the founding of our Republic, a more inauspicious time for establishing a new institution dependent wholly or in part on annual appropriations of public money.

A generous gift of private funds insured the completion of our buildings in 1917, before the United States entered the world war. At once the demands for service from the public schools and the general community doubled in amount, necessitating a larger educational and clerical staff, and greatly increased overhead. The increased cost of living made imperative a substantial advance in salaries and wages, and by 1921 our Tax Budget appropriation had reached the sum of $90,050. This had to be supplemented by $29,129 of private funds, much of which was required to meet a deficit in maintenance.

In addition to meeting from private funds these unanticipated items of development and maintenance, the Botanic Garden authorities have never requested a Tax Budget appropriation for the purchase of plants, books, specimens, lantern slides and study material to loan to schools, nor other "collections," nor for "publications relating to botany." Nearly all of our laboratory apparatus has also been purchased from private funds.

Notwithstanding our steadily increasing needs, the Tax Budget

appropriation for 1922 was reduced below that for 1921 by $3,436, or nearly 4 per cent., and the appropriation for 1923 is less than that for 1922 by $7,049, or nearly 8 per cent.—a total cut of nearly $10,500 in two years. This total reduction of nearly 12 per cent. in the Tax Budget appropriation has necessitated a steadily increasing diversion of private funds to meet the maintenance deficit.

The result has been a crippling and curtailment of our educational and scientific work in the face of steadily and rapidly increasing demands for such service as a botanic garden can and should render to the community.

Need of Increased Endowment

A situation essentially similar to that above set forth obtains for most of the museums, and other semi-public institutions of Greater New York, and emphasizes the urgent need of placing such institutions on a more secure basis so far as tax budget appropriations are concerned. In the meantime it is vitally important that our permanent private funds be greatly increased. Attention has been called to this in various preceding reports, and the need should be kept constantly before us until it is met.

In the matter of private endowment the Brooklyn Botanic Garden stands at the bottom of the list of the five largest American botanic gardens and independent botanical institutions. The youngest of them all has nearly twenty times as large an endowment as the Brooklyn Garden, and none of the income from this fund has to be used to maintain a public park area and garden, but is all available for fundamental botanical research and the necessary maintenance incidental thereto.

While research is the very life-blood of a scientific institution, it is necessary for a public Botanic Garden to maintain collections and grounds for public instruction, and to meet the cost of popular educational work with adults and children. This work is organized at the Brooklyn Botanic Garden on a scale which is, perhaps, not approached by any other botanic garden in the world.

Our need of private funds for all purposes, for 1922, was over $33,774, while the private funds budget adopted for 1923

FIG. 2. The Yuki-Yoki, Japanese Garden. Cf. Fig. 3.

exceeds a total of $50,700, for much of which we are dependent upon annual contributions. The situation is quite as unstable, and uncertain, and inadequate to our needs as is the case with the Tax Budget, and involves a considerable limitation and impoverishment of our educational and scientific activities.

To meet present needs and to place our present work on a permanent basis there is needed *at once* an increase of our permanent funds of not less than $500,000. In order that we may utilize our present plant in its full capacity the uncertain income from Tax Budget appropriation and present private funds must be augmented by an amount equal to the annual income from an endowment fund of not less than $1,000,000. Various circumstances combine to make it urgent that steps be taken without delay to secure a part, if not all, of this endowment.

Specific Needs

Among the objects and activities for which additional income is needed may be mentioned the following:

1. *Special Collections.*—Practically nothing has yet been done here in the development of special collections. Our Japanese Garden, while not coming strictly under this head, and our very popular Rock Garden, have demonstrated the value of special features, but, with the exception of our lilac collection, which is yet small in number and size of specimens, and our Iris and water lily collections, also small, little has been done along the line of horticultural collections, which are of great scientific, educational, aesthetic, and popular value.

Plans have been adopted for a *Rose Garden,* and a small beginning has been made in developing our collections of Azalea, Rhododendron, and asters. With such groups as peony, dahlia, tulip, and several others, we have done practically nothing.

2. *Beautification of the Grounds.*—The development of horticultural collections such as those mentioned above will, of course, contribute to the beautification of our grounds, but in addition there remains the ornamental planting at our various entrances. At the Empire Boulevard gate, only, has any attempt been made at suitable planting. That planting has elicited a great deal of

admiration and favorable comment, but it also emphasizes, by contrast, the need of similar treatment at our other entrances.

At no entrance is there a suitable gateway; temporary wooden bridges across the brook need to be replaced with permanent structures of architectural value; seven flights of wooden steps, constructed as temporary conveniences about seven years ago, need replacing with permanent stone steps for the sake of safety as well as looks; the plaza in front of our main building is still in the unfinished condition in which it was left when the building was completed in 1917; collections of climbing plants in several parts of the garden are still trailing on the ground in the absence of suitable pergolas and trellises on which to climb. Various other items could be enumerated. The cost of these improvements is properly chargeable against the Tax Budget appropriation, but there is little reason to expect adequate funds from that source in the very near future. All of these objects afford an excellent opportunity for memorials or other forms of private philanthropy of large civic value.

3. *Scientific Work.*—Most of the world's knowledge has been ascertained by zealous lovers of truth through investigations carried on during such spare time as could be found in lives devoted, by necessity, to other and more remunerative employment. Teachers, for example, in earlier days, were paid to teach; rarely, if ever, did one receive a salary for the purpose of extending the boundaries of knowledge. Largely within the present generation this situation has been changing, until now we have splendid foundations for the express purpose of research in both pure and applied science. In other words, it has been recognized that the extension of the borders of knowledge possesses large economic value—that "it pays" to invest money in research. The investigator himself, and the educator have always known that it paid in other than financial ways. As evidence that research, even in botany, may yield enormous financial returns one need only recall the fact that we are wholly dependent upon plants for the food of the world, and then consider that the successful raising of crops depends chiefly upon the application of botanical knowledge in plant breeding, plant nutrition, and plant diseases.

There are various reasons why it would be appropriate for the

City of New York to provide funds for research, particularly in forestry and plant pathology. To mention only one of them, there are, within the city limits over 8,000 acres of park lands, largely covered with trees and shrubs, and the city owns over 1,100 square miles of water shed, also largely wooded. This represents a forest nearly equal to the area of Long Island, and its proper maintenance is of vital concern to the health and safety of the city. Properly to care for this large forest, within and without the city, requires the application of a knowledge of forestry and of plant diseases, and there are still baffling problems, involving enormous financial loss, that cannot be solved because of a lack of *fundamental knowledge* of plant pathology.

Although it is provided, in our Agreement with the City, that the members of the Botanic Garden staff shall engage in research, "and that they shall labor to the best of their ability for the advancement of botanical science," our Trustees have never asked the city to make any special appropriation for the purpose of research.

In 1921 a gift to the Brooklyn Botanic Garden of $50,000 became available for research in plant pathology. It was provided that the principal of this gift should be expended over a period of not less than four years. No provision, however, has been made for the continuation of this work after the original fund becomes exhausted.

The investigations so far undertaken have been with special reference to the fundamental problem of disease resistance. The work of our agricultural colleges and experiment stations in combating and eliminating the destructive diseases of crop plants, is greatly hampered by the deficiencies of our knowledge of disease resistance. Investigations along this line are not now adequately provided for, here or elsewhere, and the Botanic Garden can render no more important nor more needed service to botanical research than by developing its work in this direction. Steps should be taken at once to establish the work on a permanent basis, and to extend it in scope so as to include all aspects of the problem. Investigations in genetics, plant physiology, and other lines are also now greatly hampered for lack of adequate funds.

4. *Experimental Plot and Nursery.*—For investigations in dis-

FIG. 3. The Japanese Garden after a snow storm, showing the use of the Yuki-Yoki. Cf. Fig. 2.

ease resistance, genetics, and other lines, and for propagation and nursery purpose additional land is greatly needed, readily accessible to the Botanic Garden. This need has also been noted in previous annual reports.

5. *Exploration and Field Work.*—Field work, at home and abroad, and trips for the study of foreign collections and libraries, and for other purposes are an essential part of the work of any botanic garden. We have no permanent income for this purpose and only nominal amounts have become available at irregular intervals since the Garden was established.

6. *Publication.*—It is bootless to increase human knowledge if the new knowledge cannot be disseminated, and yet nothing seems to be more difficult to secure sufficient funds for than for publishing the results of research. The Brooklyn Botanic Garden is now cooperating in the publication of three research journals. Without such help as the Garden is giving it would not have been possible to establish nor to continue them.

Each of these journals, *American Journal of Botany* (now in its tenth volume), *Ecology* (in its fourth volume), and *Genetics* (in its eighth volume), is inadequate to meet the requirements for space made upon it by investigators. The editors of each journal now have in hand manuscript enough to fill all the issues of nearly an entire volume. In other words, nearly one year must elapse after an author has had his article accepted before it can appear in type and the results of his research thus be made available to other workers. All three of our journals should be enlarged by increasing the number of issues per volume or the number of pages per issue, or both.

Manuscript is now accumulating for additional volumes of the Brooklyn Botanic Garden *Memoirs,* and funds are needed for this purpose.

It may be asked, "Why cannot scientific journals be made self-supporting." The answer is, "They might be, provided they were limited in output by the amount of income from subscriptions;" but under such limitations they would (with few exceptions) be wholly inadequate to meet existing and growing needs. The printing of scientific journals is costly, involving much tabular matter, foreign language composition, and illustration, and requiring a

good quality of rag paper to insure permanency, for, unlike the popular magazines, research journals are not of merely ephemeral interest, but have permanent value for future reference in libraries. The number of readers and possible subscribers is small in proportion to the relatively high cost of publication, and this makes necessary some form or degree of subsidy.

7. *Salaries.*—Our working agreement with the city provides that the salaries of all employees necessary to the work of the Garden shall be met from the Tax Budget. For some years, however, it has been necessary to supplement the amounts thus appropriated for certain salaries from private funds, and to provide the entire amounts of certain other salaries. Even so, our present salaries are below what is being paid elsewhere for similar services, requiring equal preparation and ability. Private funds for this purpose are now obtained partly through the uncertain method of soliciting annual contributions. This income should be put upon a permanent basis by endowment.

8. *Lectures.*—The cause of botanical science and education would be greatly advanced by the establishment of a fund for a free public lectureship or lecture course on botanical subjects, such as exists for other sciences, as, for example, the Lowell Lectures (Boston), the Harvey Lectures (New York), the Vanuxem scientific lectures (Princeton), the Silliman lectures (Yale), and others. These lectures could be both technical and popular.

9. *Library.*—The Garden has never spent in any one year more than $4,200 for its library including the purchase of books, subscriptions, and binding—averaging much less. This is a very meagre amount to expend in building up a technical library in twelve years from nothing to a collection of 8,648 books and nearly 6,000 pamphlets. We are now and have been constantly obliged to forego opportunities to purchase valuable publications essential to such a library, but which are growing more scarce and more expensive each year. A fund of not less than $5,000 is urgently needed for the purchase of sets of serials and other works, and to meet the cost of binding that has been accumulating each year beyond our ability to care for it.

10. *Retirement Fund.*—The need of providing a retirement

fund for members of the Botanic Garden Staff and other employees has been emphasized in former reports. This need has not yet been met.

THE YEAR'S ACCOMPLISHMENTS

Public Education

The year 1922 was one of vigorous growth in nearly all directions. In particular the growth of our educational work has been phenomenal. Last year, for example, we reported that 470 teachers brought nearly 25,000 pupils to the Garden for instruction; for 1922 the figures were 1,021 classes and 40,529 pupils.

In addition to these classes, our own Botanic Garden classes had an attendance of 19,654, and lectures were given to 16,850 children.

The total attendance at classes and lectures was over 77,000 children.

The attendance at lectures to adults was 1,828.

During the year 176 addresses were given at schools and clubs to a total of 16,978 auditors; about 40 requests were received which we were obliged to decline.

Study material has been supplied to 1,842 teachers and used in the instruction of 70,386 pupils. In other words, the teaching of botany, nature study, and geography of that many pupils was enriched by only one of our opportunities offered to schools.

Loan lectures, including lantern slides and text, were supplied to 42 teachers for the instruction of 5,420 pupils, and packets of seeds for planting school and home gardens were supplied to 76,528 pupils.

The total number of teachers and pupils in the public schools reached by our different educational activities, not counting those who were casual visitors to the conservatories and plantations, was 373,186, tabulated as follows:

Number of Pupils and Teachers Reached by Public Education Activities, 1922

At the Botanic Garden		
Visiting classes from schools	40,529	
Botanic Garden classes	19,654	
Lectures to children	16,850	
Conferences with teachers (34)	300	
		77,333
Extension Activities		
Attendance at lectures given at schools	16,978	
Study material supplied		
Teachers	1,842	
Pupils	70,386	
Loan lectures (lantern slides and text).		
Teachers	42	
Pupils	5,420	
Seed packets for school and home planting.		
Teachers	4,053	
Pupils	76,528	
Group conferences with teachers by request concerning methods and plans; 20 conferences:		
Number of teachers attending	3,892	
Number of pupils whose work was improved and enriched as a result of these conferences	120,462	
Nature talks to Boy Scouts and others	4,484	299,603
Total number of teachers and pupils reached		381,420

Work with Defective Children.—On October 23, Miss Shaw, accompanied by Miss Sanders, went to the Children's Psychopathic Ward of Bellevue Hospital, and taught a lesson in the outdoor garden. On November 3, Miss Sanders gave these children a lesson on the indoor planting of bulbs, and on November 27, another lesson on the making of window boxes, taking with her some Boston ferns potted up by our children in our children's greenhouse. On the same date she also gave them a lesson on Christmas trees, and how to know the evergreens. On November 23 a class of 30 crippled children from Public School 26, Brooklyn, came to the Garden in a motor bus and were given special permission to drive about the grounds under the guidance of a Botanic Garden Instructor.

The Mineola Home for Cardiac children has also been given assistance in planning their children's garden.

School for Gardeners.—During this, the fourth year of the school for gardeners, 13 pupils were enrolled, the number in attendance as of December 31 being 8 men and one woman. Certificates of proficiency were awarded to two men on their completion of one year's satisfactory service in practical work

Fig. 4. Bronze tablet unveiled May 9, 1922.

after completing their two years course of instruction at the Botanic Garden, in accordance with the requirement announced in our *Prospectus.*

Botanic Garden Posters and Subway Signs.—During May and June thirty framed colored posters, 15½ x 20 inches, giving information about the Garden were hung in the entrance vestibules of the Brooklyn Public Library and its branches.

In July the Interborough Rapid Transit Company placed on the walls of the Eastern Parkway-Brooklyn Museum Station attrac-

tive blue and white enamel signs bearing the words, *Brooklyn Botanic Garden,* with an arrow underneath pointing to the proper exit to reach the Garden. This exit is within about 50 feet of our Eastern Parkway entrance. The cost of the signs was met from Botanic Garden private funds.

Similar signs were placed in the Prospect Park Station of the Brooklyn Rapid Transit Subway (Broadway Subway) without expense to the Garden.

Investigations

Plant Pathology

The investigations in Plant Pathology have been continued by Dr. Reed and collaborators along the general lines described in the last Annual Report of the director.

Dr. Reed's experiments on the varietal resistance of sorghums to the covered kernel smut (*Sphacelotheca Sorghi* (Link) Clint.) have been continued. A series of experiments with the loose kernel smut (*Sphacelotheca cruenta* (Kühn) Potter) was also carried out and a careful comparison of the behavior of a large number of varieties of Sorghum to these two smuts was made. In general, the different varieties responded in the same fashion to the two smuts. Certain varieties, as the Milos and Feterita, showed a marked resistance to both. The Kafirs, Sorgos and Durras proved to be quite susceptible to both smuts. Some of the Kaoliangs proved susceptible but Dwarf Brown Kaoliang proved highly resistant to both smuts. Darso has consistently proved highly resistant to the covered kernel smut; on the other hand, it was readily infected by the loose kernel smut. Darso was the only striking case of a marked difference in the behavior of a sorghum towards the two smuts.

Very interesting results were also obtained bearing upon the influence of soil temperature and soil moisture on infection by covered kernel smut of Sorghum. These experiments will be repeated and extended during the present season before reaching a final conclusion as to the influence of these various factors.

In connection with the oat smuts, *Ustilago avenae* (Pers.) Jens. and *U. levis* (K. & S.) Magn., a few varieties were again tested. For the most part, these varieties were those which had shown

considerable resistance in previous years to the smuts. They responded this year in much the same fashion as previously. It may be noted that a few infections of *Avena brevis,* a highly resistant species of *Avena,* were obtained.

A large planting of second and third generation hybrids of a cross between Fulghum and Swedish Select oats was made. Both Fulghum and Swedish Select oats are valuable as commercial varieties which are adapted to different sections of the country. The Fulghum oat has proved to be highly resistant to smut, while the Swedish Select is moderately susceptible. Strains from the cross have been obtained which have shown as high a degree of resistance as the Fulghum parent. Other strains have proved to be moderately susceptible and still additional strains have shown a much higher susceptibility to both smuts than the more susceptible parent.

A series of plantings of a few varieties of oats—some highly susceptible, others highly resistant—were made on a number of different dates. The highest percentages of infection were obtained towards the latter part of April and the first of May, while lower percentages were obtained in the very early or very late plantings.

Some phases of the investigations on oat and sorghum smuts are regarded as completed and two manuscripts have been submitted for publication. Since this work has been in cooperation with the Office of Cereal Investigations, U. S. Department of Agriculture, the manuscripts have been submitted to that office for consideration. Two additional manuscripts are practically ready for submission for publication.

In the last report, the appointment of Mr. James A. Faris as Research Fellow was noted. He has been engaged upon the problem of determining the influence of temperature and soil moisture upon the infection of the host by certain smuts, using principally the covered smut of barley. During the past year he has obtained some very important results and is making a successful attack upon this problem. He will continue these investigations this year and should be able to clear up various points in connection with the influence of these factors.

The attention of Mr. Faris was called to a certain disease of ferns which was proving injurious to some of the Boston fern mutants of Dr. Benedict. He has succeeded in demonstrating that a hitherto undescribed species of *Glomerella* is the cause of the disease, and has prepared a paper which describes the symptoms of the disease and the causal organism, and has suggested methods of control. This paper will appear in an early number of *Mycologia.*

Miss Dorothy P. Tuthill completed in May her work on the problem which served as the basis of her thesis. She prepared a report on various diseases of ornamental plants, describing the causal organisms of these diseases, the pathological effects on the host, and the recommended methods of control. Her thesis was accepted in partial fulfilment of the requirement for the degree of Master of Arts by New York University.

Forest Pathology

Dr. Graves, Curator of Public Instruction, has continued his investigations in the diseases of forest trees. A study begun more than four years ago, of a serious disease of the butternut and Japanese walnut which is also significant in its possible relations to other species of walnut, is now completed. In a paper soon to be published, the nature of this trouble is set forth for the first time and remedies are prescribed. The fungus associated with the disease has been carefully studied and two forms which had passed as different species are now proved, by cultural methods, to be one and the same.

In connection with his position as collaborator in the Office of Investigations in Forest Pathology, Bureau of Plant Industry, U. S. Department of Agriculture, Dr. Graves has, during the past year, advanced his work on resistance to the destructive chestnut bark disease. Trees of American chestnut which were resistant to the disease were discovered by him in the neighborhood of New York in 1918. With a view to securing a resistant strain for planting purposes it is planned to cross these resistant New York trees with resistant Chinese and Japanese stock.

Exploration

During the forepart of the year, Dr. Orland E. White, the curator of plant breeding, was engaged in botanical exploration in Bolivia and Brazil as the joint representative of the Department of Economic Botany of the Bussey Institution, Harvard University and of the Brooklyn Botanic Garden on the Mulford Biological Expedition. He returned on April 14 and the remainder of the year was largely spent by him in work connected with the expedition's results and collections.

Among the noteworthy collections made by Dr. White on this trip were those of the Coto and Para-Coto bark, at Covendo. The botanical origin of these important medicinal barks was hitherto unknown, except that they belonged in the family Lauraceae, and practically all of our supplies of these barks during recent years have been wholly spurious. Dr. White collected bark and herbarium specimens of both the Coto and the Para-Coto, as well as bark and herbarium specimens from trees of similar and related species which have furnished the spurious bark. According to the report of Dr. Rusby, the leader of the expedition (*Jour. N. Y. Bot. Gard.* 23: 101–112. 1922), the result of Dr. White's work will be to establish the possibility of securing pure supplies of these barks in the near future. Further details concerning Dr. White's work in South America will be found in Dr. Rusby's report, just cited, and also in Dr. White's report published in the Brooklyn Botanic Garden RECORD for July, 1922.

The Coto bark tree and two of its relatives, collected by Dr. White, are described by Dr. Rusby (*Bull. Torrey Bot. Club* 49: 259–264. 1922) as species new to science, under the names *Nectandra coto* Rusby (the true Coto tree), *Ocotea pseudo-coto* Rusby, and *Aerodiclidium benense* Rusby, the latter two spurious substitutes, medicinally worthless, so far as known.

A report of the discovery of the Coto tree and the character of its surroundings, by Dr. White, is incorporated in an article in the *Journal* of the American Pharmaceutical Association, volume II, pages 775–781.

Ecology

Mr. Taylor has continued his studies upon the vegetation of Long Island, and in cooperation with Major Barrington Moore, upon that of Mt. Desert Island, Maine. The comparison of the soil and climatic factors of these widely separated islands, both of which support the pitch pine, is yielding instructive information upon the forest possibilities of both localities.

The *Vegetation of Long Island* which it was originally intended should be issued as one *Memoir* volume, has been, with my consent, divided into separate parts, such as grasslands, forests, coastal marshes, etc. Each of these present special problems, often of considerable economic importance, and it seems best to issue these reports when completed. The first on *The Vegetation of Montauk: A Study of Grassland and Forest* will be ready for the press early in 1923. Further details of this may be found in the appended *Report of the Curator of Plants.*

Genetics

Experiments by the director of the Garden on the effect of radium rays on germ cells, the beginning of which was noted in my preceding annual report, were continued, in cooperation with Dr. A. F. Blakeslee, Carnegie Station for Experimental Evolution, Cold Spring Harbor, L. I. In these experiments ovaries of young flower buds of the Jimson weed or Thorn apple (*Datura Stramonium*) of pedigreed stock inbred for about twelve generations by Dr. Blakeslee, were exposed to gamma rays from radium emanation contained in a sealed glass tube. The exposure was made by inserting the tube, which was about the diameter of a large needle, into one of the four cells of the ovary. Numerous exposures were made for varying periods of time with a varying strength of radiation. An exposure of ten minutes with a strength of 13 microcuries was followed by a great increase in the percentage of mutant forms. The maximim was 33.33 per cent. for the ovules in the cell into which the radium tube was inserted, 16.07 per cent. for the cell farthest away, and an average of 16.96 per cent. for all four cells. The average percentage of mutants in the same stock for four years (1919–1922), without experi-

FIG. 5. The Japanese Garden, showing wistaria and azalea in bloom. Inari shrine in the distance.

mental treatment, was 1.38 per cent., with a maximum in one case, in 1920, of 7.07 per cent. due possibly to the effect of low temperatures prevailing in late fall when pollination and fertilization took place. In all about ten different mutant types appeared, one of which, called *Nubbin*, has never before been observed in Dr. Blakeslee's cultures. The mutant form called *Microcarpic*, when selfed gave rise to albinos in the Mendelian ratio of three albinos to one normal green plant. A preliminary report on these experiments was presented at the Boston (Cambridge) meeting of the Botanical Society of America, December 28, 1922. Further studies are necessary in order to establish whether or not the results obtained may, without question, be attributed to the influence of the radium rays.

Genetic studies on peas, by Dr. White, were resumed in the fall and the inter-relations of the hereditary factors already discovered in the genus are being worked out. The factor A (producing rose or salmon-pink flowers) has been found when associated in the same plant with Factors P_1 and P_2 (factors for anthocyanin pod coloring) to give reddish-pink pods in place of the ordinary green pods. When the factor B (which modifies the expression of A and gives reddish purple flowers) is present, in addition to the factors mentioned above, the pods are dark purple in color. Purple tinged pods have been produced on white flowered plants from crosses involving in part a purple-pod ancestry. Green-podded segregates from a similar ancestry have also given purple-podded plants. A summary of Dr. White's work on the genetics of peas has recently been incorporated in a chapter on *Breeding Vegetables* (pp. 236–241) in an agricultural textbook entitled *Breeding Crop Plants*, by Professors Hayes and Garber of the University of Minnesota.

Upon his return from South America, Dr. White was elected editor of the genetics section of *Botanical Abstracts*, and during the latter part of the year he has devoted considerable time to this work.

Dr. Benedict, Resident Investigator, has continued his investigations on the variation of the Boston fern and related forms of *Nephrolepis*. During 1922 particular attention has been paid to (1) reversions of tertiary and higher sports of Boston fern; (2)

new and undescribed progressive sports of various sorts; (3) spore variations, both first and second generations of the single known spore-fertile variety; and (4) a comparative study of the variations of the once-pinnate forms of whatever origin with special reference to their horticultural value. In addition, some study has been made of analogous types of variations found among wild species of native ferns.

Numerous connections, by correspondence and personal visits, have been established and continued with commercial florists about New York City. During the summer two extended trips for this purpose were made, one to Boston and its environs, and the other covering Philadelphia, Washington, and Pittsburgh. The expenses of these trips were covered by the grant of one hundred and twenty-five dollars made for this purpose by the American Association for the Advancement of Science at its Toronto meeting in 1921.

In connection with the study of the commercial value of the once-pinnate varieties of Boston ferns, visits were made to twenty-five or more retail florists of Greater New York. The Brooklyn Botanic Garden *Leaflet,* " Ferns as house plants," reprinted from the *American Fern Journal* for July–September, 1922, has been distributed to a considerable number of florists. In the various florists' trade periodicals of the United States, and in one or two in England, there was published early in the year a copy of the large chart of the genealogy of the Boston-fern varieties, exhibited in 1921 at the Boston Fern show of the Massachusetts Horticultural Society, together with explanatory discussion. In the latter part of the year, a series of articles under the general title " What we know about Boston ferns " appeared weekly in the *Florists' Exchange.*

As a by-product of this study of *Nephrolepis* there may be mentioned the fact that the summer culture of extra plants in temporarily unoccupied greenhouse space and under lath shelter in the experimental garden, resulted in surplus plants, numbering over one thousand, many which have since been made use of in classes for teachers and children. The majority of these ferns were given to visiting classes for use in class rooms of Public Schools. In connection with the study of the commercial value

of different varieties, several hundred plants representing sets of selected varieties, have been widely sent out to commercial growers and agricultural schools for extension of some of the experimental studies.

Systematic Botany

For several years Dr. Gundersen has been engaged in a study of the general problem of the relationship and evolutionary sequence of the families of Dicotyledons, at first with reference to the Sympetalae, the group of families whose flowers have their petals united. During the past two years special attention has been given to groups with parietal placentation (*e.g.,* Violaceae and Passifloraceae), and central placentation (*e.g.,* Caryophyllaceae and Primulaceae). In connection with studies of floral structure, drawings of flower sections have been made by Miss Maude Purdy, and photographs of flower sections from nature, by Mr. Louis Buhle. The work is particularly concerned with new lines of evidence as to family relationships, especially where such evidence appears to lead to conclusions at variance with generally accepted views. Such studies as this would eventually make possible a reconstruction of the "family tree" of Dicotyledons more nearly in accord with the facts of nature.

Herbarium

In connection with the investigations in plant pathology, the Garden has been fortunate in being able to purchase the unusually valuable mycological collection of Dr. Franz Bubák, formerly professor of botany and plant pathology in the Royal Agricultural Academy and director of the Botanical Garden at Tabor, Bohemia.

The collection consists of 33,779 specimens most of which are arranged in 139 fascicles. In the 31,548 specimens thus arranged, 8,127 species of Fungi are represented. These are distributed among the principal groups of Fungi as follows: Myxomycetes, 66; Basidiomycetes, 1,230; Ascomycetes, 2,139; Hemibasidii, 267; Uredinales, 1,437; Imperfecti, 2,796; and Phycomycetes, 192.

The collection includes the specimens which served as the basis for Dr. Bubák's numerous contributions to mycology and plant pathology. Dr. Bubák has made very extensive mycological col-

lections in Czecho-Slovakia, Montenegro, Serbia, Hungaria, Moravia and adjacent parts of Central Europe. He described more than 500 species of Fungi new to science and his original, or type specimens, are represented in the collection.

The collection also includes a number of very important exsiccati, such as Jaap, Fungi selecti; Kabat and Bubák, Fungi Imperfecti; Krieger, Schädliche Pilze; Komarov-Tranzschel, Fungi Russiae; Maire, Hypodermaceae gallione; Sydow, Fungi austroamericani, Fungi exotici, Phycomyceten, and Ustilagineen; Tranzschel-Serebrianikow, Mycotheca rossica.

Dr. Bubák, for many years, was director of the Botanical Garden at Tabor, Bohemia. During this period he made numerous valuable contributions to Mycology and has furnished along with his collection, practically a complete set of reprints of his publications, to the number of about 75. Some of his more important contributions are as follows: "*Beitrag zur Pilzflora von Ungarn,*" "*Beitrag zur Pilzflora von Montenegro,*" "*Beitrag zur Kenntnis der Pilzflora Bulgariens,*" and "*Die Pilze Böhmens.*" As a result of the political and economic changes in Central Europe in recent years, the Agricultural Academy in Tabor has been discontinued, and Dr. Bubák has been made professor of plant pathology in the Technical School at Prague.

Additional herbarium cases are greatly needed to insure proper protection to these specimens and to facilitate their use.

Besides the Bubák collection, 1,736 specimens of fungi and 228 specimens of algae and mosses have been added to the cryptogamic herbarium—in all, 35,743.

Phanerogamic.—A total of 3,704 specimens have been added to the phanerogamic herbarium (flowering plants and ferns), all of which were obtained by gift, exchange, and collection. Additional cases are also needed for this collection.

Gifts to the collection are acknowledged in Appendix 1 of this report.

Library

The outstanding fact in connection with the library is the substantial increase in its usefulness. The number of readers increased 40 per cent. over 1921, and the amount of bibliographical

and reference work which the library staff has been called upon to do, especially for the outside public, has considerably increased. The total number of printed pieces received is 5,777, of which 988 are books, 556 pamphlets, and 6,033 parts of publications. The number of serial publications currently received in 598, an increase of 69. The library is perhaps weakest in complete sets of serial publications, and attention has been called above (p. 34) to the need of funds for this purpose.

Gifts to the library are acknowledged in Appendix 1 of this report.

Conservatories

The attendance at the conservatories (24,455) shows an increase of 5,455 over 1921, which is practically the same as the last annual increase. The evolution group in house No. 2 has been rearranged in a way to increase its educational value, and the economic house is visited by an increasing number of classes in nature study, botany, and geography. The growth of the conservatory collection practically ceased several years ago on account of lack of room, but the collection is being maintained in an excellent condition, and revised from time to time by the substitution of new or educationally more valuable plants for those of less value. Further growth will not be possible until new houses can be built.

Plantations and Grounds

The year's work included the usual annual maintenance, the addition of 766 labels, the rearrangement of certain groups, the preparation of a map of the general systematic section, and smaller maps or plans of trees and shrubs; grading work, especially on the North Addition, new planting, collections of seeds for exchange, and studies and collections of plants in the scientific collection.

A support of steel posts and wires was provided for the climbing roses along the eastern edge of the children's garden, and the monocotyledon area was laid out in accordance with new plans and most of the beds made, preparatory to the spring planting. Full details of all work are given in the accompanying report of the curator of plants and plantations.

New Appointments

Miss Edith R. Sanders was appointed instructor beginning April 1, in place of Miss Edna L. Burtis, resigned; and Miss Maude L. Hickok was also appointed instructor beginning July 1, in place of Miss Eugenie Blank, resigned.

Miss Blanche McHale was appointed assistant secretary beginning April 24, in place of Miss Hazel Hoyt, resigned.

Annual Spring Inspection

The attendance at the eighth annual spring inspection, May 9, was about 500, the largest in the history of the Garden. On this occasion there was unveiled the bronze tablet to mark the white oak tree planted at the annual inspection of May 9, 1916, by Mr. Alfred T. White. A full account of these exercises appeared in the Brooklyn Botanic Garden Record for July.

Woman's Auxiliary

The success of the Annual Spring Inspection is due in large measure to the cooperation of the Woman's Auxiliary. During the year the Auxiliary, and its members individually, have rendered the Garden numerous valuable services which are here gratefully acknowledged.

Cooperation

Special attention is called to the list (at the beginning of this report) of 641 municipal and other free public institutions and organizations of Greater New York, and other domestic and foreign institutions and organizations, with which the Brooklyn Botanic Garden has cooperated during 1922. The wide extent of this cooperation is an index of the local and wider usefulness of the Garden. In all cases the cooperation has been of mutual advantage.

Acknowledgments

A list of gifts to the Botanic Garden is given in Appendix 1. The thanks of the Governing Committee has been extended to the donors, and public acknowledgment is here made of our sincere appreciation, not alone of the gifts themselves, but of the spirit that prompted them.

To the chairman and members of the Botanic Garden Governing Committee, and to other members of the Board of Trustees, the director wishes to express his appreciation for their generous and sustained interest and support.

It is also a great pleasure to note here the fine *esprit de corps,* and spirit of loyalty to the Botanic Garden that prevails throughout our entire organization. There was group expression of this at our organization dinner, held in the rotunda of the laboratory building on April 20, on the occasion of the return of Dr. White from South America. This dinner was attended by the scientific and educational staff and all other permanent employees, together with invited guests, representing the Governing Committee, the Trustees, and the Woman's Auxiliary—a total of 59 persons.

The annual reports of heads of departments, financial statements, and Appendixes 1–8 are appended as integral parts of this report.

Respectfully submitted

C. Stuart Gager,
Director.

REPORT OF THE CURATOR OF PLANTS AND PLANTATIONS FOR 1922

Dr. C. Stuart Gager, Director.

Sir: I take pleasure in submitting herewith my report for the year ending December 31, 1922.

General Maintenance and Construction Force

Work began March 20 and ended November 10, which was a shorter period than for 1921. During our busiest season the number of men averaged 13–15, but this number was continued only for 13 weeks, when the force was cut to 12 men. Of these, two are stationed on practically fixed tasks, so that for the bulk of the season our effective laborers for new work, as well as general maintenance, are reduced to ten.

With this force the new work was confined to raising two hills, grading and sodding same, and seeding the adjoining area near

the service gate at Flatbush Avenue; laying 350 feet of cast iron sewer pipe to replace clogged tiles along the brook; continuation of the grading operations between the resevoir and museum at Eastern Parkway end of the grounds; building 156 feet of stone steps on the completed slope at the west side of the newly graded area at Eastern Parkway; and making a temporary wooden bridge across the brook, just south of the lake outlet. As I have reported before, this does not leave enough leeway, even with this restricted output of new work, for the proper maintenance of that part of the upkeep of the grounds which is done by this force. As in the past, the laborers have dug many holes for tree planting for the gardeners.

Gardening Force

The new work done by this force has been as follows:

1. Planting as much of the shrubbery collections on the newly graded area at Eastern Parkway as possible. There is still as much again to be done, which awaits permanent grades.
2. Planting the extension of the rock garden, on east side of walk; and the enlargement of the "moraine."
3. Screen planting of Poplars on the Museum bank.
4. Planting *Lonicera* on the fence of experimental enclosure.
5. Preparing soil for border outside this fence and planting perennial asters there.
6. Making and planting new fern bed, and planting associated conifers just east of the brook, near its upper end.
7. Additions to *Azalea* and *Kalmia* plantings at Malbone Street gate, and in the Local Flora section.

There has been, in addition to this, a good deal of rearrangement of existing collections, thinning out, etc., notably the horse-chestnut and boxwood collections, and a complete new layout for the monocotyledons. Such disturbances of existing collections are only warranted if the changes seem very urgent, as, particularly in the case of woody plants, their growth is materially hampered by transplanting.

Perhaps the most interesting and delightful gardening operation was the growing of the perennial asters, imported from England. The many forms of these autumn flowering herbs attracted a good deal of attention, but details regarding them need not be repeated here, as they were noted in the RECORD for October, 1922.

Labeling and Record Work

The number of labels made was as follows:

Steel plant labels	420
Lead labels for the woody plants	216
Greenhouse lead labels	125
Large wood labels	5
Total	766

Besides many signs for the bulletin boards, notices of lectures, general notices, miscellaneous smaller labels, and several large charts.

The general map of the systematic section of the garden was completed and blueprints made. In connection with the completion of this map the locations of the conifers, horse-chestnuts, and of various other families were changed.

The Evolution Exhibit in Conservatory House No. 2 was rearranged to more clearly exhibit relationships, and a long zinc label made, briefly telling the story of plant evolution.

During the spring came the annual planting of the herbaceous beds, and records were made of all new plantings. Many plants were labeled, both in the conservatories and on the grounds. Cultivated plants were collected and mounted, and a special effort was made to complete the collection of half-size specimens of cultivated trees and shrubs. Service labels were made for plants in the propagating houses, cold frames, and the rock garden, and all new plants recorded. About seven hundred and fifty old-style labels were galvanized for use in the herbaceous beds. These galvanized labels are much more durable than the ungalvanized ones formerly in use.

Maps of the trees and shrubs were corrected and remade by Miss

Margaret Chapin during April, May, and June, and the seed collection was partly arranged.

A systematic list of the trees and shrubs was completed this year and compared with the Arnold Arboretum list. Later a systematic list of the herbaceous plants in the beds was begun.

Studies were made for about six weeks during the fall of the plants in the herbaceous beds. Dr. Gundersen made collections of seeds, from the Catskills, for distribution. The annual *Seed List* was compiled, printed, and distributed.

The number of species and varieties of plants raised from seed during the year was 519.

Consignment numbers 22–1 to 22–65 were assigned during the year to a total of 1,304 living plants received. Of these, 519 were plants raised at the garden from seed, and 103 were varieties of rose cuttings received as an exchange from the Rochester Park Department. The remainder were by gift, purchase, or exchange, as noted under Miscellaneous Statistics.

Phanerogamic Herbarium

The total number of herbarium specimens acquired during the year was 3,704, of which 1,841 were gifts, 1,607 received by exchange, 256 by collection. No herbarium specimens were purchased this year. The specimens received by gift and exchange are listed under Miscellaneous Statistics.

The number of specimens mounted for the herbarium was 945. Fumigation of the mounted collections was carried on regularly throughout the year.

The herbarium workroom was divided into two parts, one to be used by the Department of Public Instruction as a seed room and the other part for the herbarium workroom. The collections of plants and materials stored in this room were arranged to be more readily available.

Special mention is made here of the gift of Miss A. E. Hamilton, Baldwin, Long Island, of 1,245 specimens, most of which were collected on Long Island, and of the gift of 149 specimens, all from Long Island, by Mr. William C. Ferguson. Some of the latter are species not before recorded from Long Island.

FIG. 6. Monstera deliciosa in bloom in the Economic House of the Conservatories.

Miscellaneous Statistics

Phanerogamic Herbarium

Distribution by Exchange

To Dr. L. H. Bailey, Ithaca, New York, 100 pressed specimens of plants cultivated in the Brooklyn Botanic Garden.

To Professor J. E. Kirkwood, State University of Montana, Missoula, Montana, 20 specimens of trees collected in the Brooklyn Botanic Garden and Prospect Park.

Specimens Received by Exchange

From Mr. H. D. House, State Botanist, Albany, New York, 1,607 miscellaneous specimens.

Specimens Received by Collection

From Dr. Orland E. White, with the Mulford Expedition for the Biological Exploration of the Amazon Basin, 256 specimens.

Living Plants Obtained by Collection

From Dr. Orland E. White, with the Mulford Scientific Expedition, Bolivia (1).

Living Plants Obtained by Exchange

Cambridge Botanical Garden, Cambridge, England (14).

U. S. D. A. Office of Foreign Seed & Plant Introduction, Chico, Cal. (5).

U. S. D. A. Office of Foreign Seed & Plant Introduction, Miami, Fla. (21).

U. S. D. A. Office of Foreign Seed & Plant Introduction, Bell Plant Introduction Garden, near Glen Dale, Md. (4).

U. S. D. A. Office of Foreign Seed & Plant Introduction, Washington, D. C. (1).

New York Botanical Garden, Bronx Park, New York City (75).

Miss Mary F. Wright, Logan Nurseries, Philadelphia, Penn. (9).

Mr. Clarence Lown, Poughkeepsie, New York (101).

Mr. Leonard Barron, Garden City, Long Island (1).

Rochester Park Department, Rochester, N. Y. (1).

Vassar College, Poughkeepsie, New York (8).
Mrs. Francis King, Alma, Michigan (2).

Living Plants Distributed by Exchange

During the past year 471 living plants were distributed to other institutions.

Seeds Distributed to Other Institutions

On an exchange basis, 2,478 packets of seeds were distributed to other institutions.

Seeds Received by Exchange

On an exchange basis, 1,921 packets of seeds were received from other institutions, together with 103 varieties of rose cuttings.

Seeds Purchased

Seventy-three packets of seeds were purchased during the year.

Personal Activities

The "Vegetation of Long Island," originally planned in one memoir volume, has been divided to appear in parts, the first of which is now nearly ready for the printer. It is entitled "The Vegetation of Montauk: A study in grassland and forest."

The study of the forest area of Long Island, which has been carried on for several years, has been continued. During the growing season a "Big Tree" contest was started throughout the Island and netted a large number of records. The results of this were announced in the Garden *Leaflets* (Series X, No. 8, October 4), and the information collected is now being correlated with soil and climatic factors from the different sites.

As before, Major Barrington Moore and myself have continued the ecological survey of the vegetation of Mt. Desert Island. This involves running a series of instruments there, as well as a similar set in the pine barren portion of Long Island for comparison. One more season's readings of these, both on Long Island and in Maine, will complete this part of the work.

I have continued the collection of Long Island and Mt. Desert Island soils (in cooperation with the Bureau of Soils), and of

specimens for the herbarium. The latter, together with specimens from other collections, are all being checked with the manuscript list of species of Long Island plants. There must, however, be a good deal more of such work before we are justified in getting out a flora of Long Island.

Respectfully submitted,

NORMAN TAYLOR,
Curator of Plants and Plantations.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1922

DR. C. STUART GAGER, DIRECTOR.

Sir: I beg to submit herewith my report for the year ending December 31, 1922:

Public Lectures

During the year the following public lectures were delivered at the Garden:

1. March 23.—The Flora of Greenland: Its Affinity to Surrounding Arctic Lands and Probable History. Dr. Morten P. Porsild, Director of the Danish Arctic Station, Disco, Greenland.

2. April 7.—The Cultivation of Woodland Flowers. Mr. Norman Taylor, Curator of Plants, Brooklyn Botanic Garden.

3. April 14.—English Gardens. Miss Hilda Loines, President of the Woman's Auxiliary, Brooklyn Botanic Garden.

4. April 16.—The Virgin Forest of Java. Professor J. P. Lotsy, Research Fellow, Dutch Academy of Sciences, Velp, Holland.

5. April 21.—American Forests and the Necessity for Regrowth. Professor J. W. Toumey, Yale School of Forestry, New Haven, Conn.

6. April 28.—The Civic Value of Botanic Gardens. Dr. C. Stuart Gager, Director, Brooklyn Botanic Garden.

7. October 7.—A Garden Pilgrimage in England. Mr. Montague Free, Horticulturist, Brooklyn Botanic Garden.

8. October 14.—The Origin of Cultivated Plants. Dr. Orland E. White, Curator of Plant Breeding, Brooklyn Botanic Garden.

FIG. 7. Crocuses on the Border mound, May 12, 1922.

9. October 21.—Four Seasons in the Garden. Mr. Leonard Barron, Editor of the Garden Magazine, Garden City, L. I.

10. October 28.—Health and Disease in Plants. Dr. Arthur Harmount Graves, Curator of Public Instruction, Brooklyn Botanic Garden.

The attendance, while not large, was satisfactory, and should increase from year to year as wider publicity is given to this feature.

Loan Lectures

Sets of lantern slides illustrating Plant Life, Spring Wild Flowers, and Common Trees were lent to 42 teachers during the past year. We are considerably handicapped in this work on account of lack of means for delivery and return of these lectures. This, and other phases of our cooperation with schools, would be facilitated and could be greatly extended if a small automobile were available. Such a car would also be a great saver of time and energy in connection with the many trips made by members of staff to give addresses at schools, and for delivering study material to schools.

Class Material for Schools

During 1922, 48 requests were received from the different schools for agar for the study of bacteria and molds, for Spirogyra, Elodea, fern prothallia, not to mention a much larger number received by the Department of Elementary Instruction for fruits, leaves, plants, etc. In 1921 there were only 27 requests for such material, so that the demand this year has nearly doubled. Three hundred and fifty petri dishes containing agar, 57 test-tube agar slants, and 16 flasks of agar were distributed.

Scout Work, Etc.

Mr. Stoll, during vacation and holidays, visited numerous groups and camps of Boy Scouts, Y. M. C. A., and similar organizations for the purpose of giving instruction and examinations; in this way reaching a total of 4,630 young people. The entire month of July was devoted to this work among the eighteen Boy Scout Camps on Kanohwahke Lakes on Bear Mountain, near Tuxedo, N. Y.,

which have a daily registration of 2,500 Boy Scouts with their leaders. In this particular field Mr. Stoll reached about 3,500 boys.

In February and March classes of Girl Scouts received instruction in nature study at the Garden from Miss Shaw and Miss Hammond.

Classes and Attendance

The United States Veterans' Bureau continues to avail itself of the opportunities afforded by our course for the training of gardeners. During the year five new men—veterans of the World War—have entered. The major part of the instruction, including the practical work, is given most efficiently by Mr. Free, the Horticulturist of the Garden. He has been assisted by Dr. White, Dr. Gundersen, Mr. Stoll, and by myself.

The total attendance this year at all our classes and lectures was 78,861, an increase of nearly 25 per cent. over that of last year, which itself showed an increase of 15 per cent. over the year preceding. This is in continuation of the normal, steady increase in the attendance since this work was inaugurated ten years ago next October. The increase is also partly due, I believe, to the wider publicity given to the Garden during the year. It is becoming known to an increasingly wider circle of people each year.

TABLE I

ATTENDANCE AT THE GARDEN DURING 1922

	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes	1,171	1,580	1,511	1,523	1,652	1,302	2,407
At visiting classes	816	120	711	4,351	7,413	4,796	780
At lectures to children	352	120	355	3,421	2,234	2,094	260
At lectures to adults	0	0	150	804	274	0	25
At conservatories	1,070	1,659	2,119	3,717	2,608	1,202	1,851
Total registration at gates	15,148	17,503	27,816	37,095	53,920	34,977	44,568

	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes	2,763	1,335	1,513	1,499	1,398	19,654
At visiting classes	0	920	8,391	10,537	1,694	40,529
At lectures to children	0	520	3,103	4,003	388	16,850
At lectures to adults	0	0	425	0	150	1,678
At conservatories	1,579	1,909	2,948	2,782	1,011	24,455
Total registration at gates	44,196	38,711	39,327	28,831	15,400	397,492

Personally, I have conducted two public courses: one in the spring on the trees and shrubs of Brooklyn and vicinity, with a registration of 66 people; and the other in the fall on trees and shrubs in their winter condition, attended by 26 people.

The following table shows the attendance and registration at the Garden during 1922:

Graduate Study

In connection with the cooperative agreement with New York University, whereby candidates for advanced standing in that institution receive graduate instruction in botany at the Garden, Dr. C. W. Ballard, Associate Professor of Materia Medica at Columbia University, registered with us in October, and under our direction has begun investigations in mycology and in the histology of the drug plants collected in 1921–22 on the Mulford Expedition for the Biological Exploration of the Amazon Basin.

Exhibitions

From May 9 to 31 we held an exhibition of batik work in which the designs employed were suggested by parts of plants, such as cross-sections of stems, ovaries, etc., as well as by the flowers and inflorescences. The pieces were the handiwork of Miss Anna Heyward Taylor, who, so far as we can ascertain, is the first to make use of microscopic plant sections for patterns in this way. The attendance at this exhibit was about 1,000. At the Ninth Annual Garden Exhibit for Brooklyn boys and girls, held in the central rotunda of the Laboratory Building on September 29 and 30, the attendance was 560.

During the year Dr. Gundersen, Associate Curator of Plants, has installed in House No. 2 of the conservatories a permanent exhibit illustrating plant evolution. On the central bench in this house are typical plants arranged in order, to illustrate the probable sequence of plant groups through the ages up to the present time. Appropriate explanations accompany the series.

The exhibit of Boston fern varieties in House No. 10 has also been enriched by Dr. R. C. Benedict, Resident Investigator, and a genealogical chart has been installed at the entrance, setting forth

clearly the origin of the principal varieties and designating those most suitable as house plants.

Editorial Work

Leaflets.—During 1922 ten numbers of the *Leaflets* were issued as follows: 1. Arbor Day. 2. Ninth Annual Garden Exhibit for Brooklyn Boys and Girls. 3. Evolution as Illustrated by Ferns. 4. Brazil Nuts. 5. The Wardian Case. 6. The Evolution Group at the Brooklyn Botanic Garden. 7. Bulb Culture. 8. The Forests and Some Big Trees of Long Island. 9–10. Ferns as House Plants.

American Journal of Botany and Botanical Abstracts.—During the year I have continued to represent the Brooklyn Botanic Garden on the Editorial Board of the *American Journal of Botany;* and have accepted an assistant editorship of the Botanical Education section of *Botanical Abstracts.*

Newspaper Work

As intimated in my report of last year, it has been felt that the Garden may be of continually greater service to the public as it becomes better and better known. There are many people in Brooklyn who do not know of the advantages it freely offers. How to get these people acquainted with this institution and to realize its benefits is a problem we are trying to solve. There are today, everywhere, many competing influences, some of them of questionable nature, so that even our public libraries are employing their publicity agents.

Beginning at the time of my appointment in September, 1921, articles were sent to all of the New York and Brooklyn papers once in two weeks. These articles have dealt with every phase of activity in the Garden, such as announcements and reports of public lectures, announcements and reports of progress of the various classes for the public, announcements of exhibitions, cooperative work with the schools, the prosecution and the results of research, noteworthy features about particular plants in the Garden, personal activities of members of the staff, etc. In August, 1922, we began sending out these articles every week, and have con-

FIG. 8. Bunch of bananas harvested in the Economic House of the Conservatories. The stem of the plant is shown at the left.

tinued this policy to the present time. In all, up to January 1, 1923, 124 articles have been written.

The attitude of the New York papers has been most gratifying. From the beginning they have cooperated in every way. Every week, throughout the year, articles about the Brooklyn Botanic Garden have appeared in at least half a dozen Brooklyn or New York newspapers, and all of the papers named below have many times during the year published items about the Garden, varying from one or a few inches to an entire page with illustrations: *New York Evening Post, Brooklyn Standard Union, New York Times, New York American, New York Evening Journal, New York World, Brooklyn Eagle, Brooklyn Citizen, New York Herald, New York Evening Sun, Brooklyn Times, Brooklyn Chat, Brooklyn Life, New York Globe and Commercial Advertiser, New York Tribune, New York Telegram, New York Call.*

In addition, several articles have been syndicated and printed broadcast throughout the country. Other items have been copied (in some cases with slight alterations) from the New York papers, so that during the year, to our certain knowledge, in the country at large, the following newspapers and periodicals, outside of Brooklyn and Manhattan, have printed material about the Brooklyn Botanic Garden. This list is far from complete: *Chronicle Telegraph* (Pittsburgh), *Public Ledger* (Phila.), *Inquirer* (Phila.), *Evening Bulletin* (Phila.), *North American* (Phila.), *Bronx Home News, Journal* (Jersey City), *Star Eagle* (Newark), *Ledger* (Newark), *Evening News* (Newark), *Post* (Boston), *Herald* (Boston), *Evening Transcript* (Boston), *Hartford Courant, Vassar Miscellany News, Times* (Washington), *Star* (Washington), *American* (Baltimore), *Star* (Kansas City), *Journal* (Minneapolis), *Herald Examiner* (Chicago), *Florists' Exchange, Horticulture, Science.* In connection with the "Big Tree" Contest (see p. 56) articles appeared several times in each of 84 newspapers on Long Island outside of Brooklyn.

As a result of this, we have received inquiries from all parts of the country, asking for further information about our plants, activities, methods, how the Garden was established, and how best to proceed in order to secure the establishment of a similar institution in the correspondent's own city.

Staff Meetings

Regular monthly meetings of the staff and registered students have been continued during 1922. These meetings are addressed by the director and the members of the different departments, their primary object being to enable the personnel of the staff to become thoroughly acquainted with the various Garden activities; *e.g.*, the work of the different departments, the improvements on the grounds, additions to the collections, investigations in progress, and any features about which they may be requested by visitors to give information.

Scientific Investigation

Work on a new disease of the butternut which I have been studying for the last four years is now completed and will appear shortly in *Phytopathology*. The fungus is a weak parasite, as determined by inoculation experiments, growing slowly in vigorous trees—more rapidly if they are weakened. It is important not solely because it attacks the butternut (and Japanese walnut), but especially because of its possible pathogenic relations to other trees of the same genus, such as the black walnut and the Persian or English walnut.

Investigations have been continued on the American chestnuts in the vicinity of New York, found in 1918, which are resistant to the dread chestnut blight. Plans are being formulated for the cross-pollination of these individuals with resistant Chinese and Japanese stock at Washington, D. C., during the coming June, with a view to securing seed which will possess enhanced resistance qualities.

The chestnut disease fungus has also been found attacking living scarlet oak (*Quercus coccinea*) in Connecticut, and a note on this occurrence is being prepared for publication.

Respectfully submitted,

ARTHUR HARMOUNT GRAVES,
Curator of Public Instruction.

FIG. 9. Products of the Children's Garden: Main entrance to Children's Building.

REPORT OF THE CURATOR OF ELEMENTARY INSTRUCTION FOR 1922

DR. C. STUART GAGER, DIRECTOR.

Sir: I herewith submit the following report, bringing to your attention three aspects only of the work covered in 1922 by the Department of Elementary Instruction. These may be classified under the following heads: educational demands, equipment, and departmental changes.

Educational Demands

The attendance figure of all visiting classes for the past year was 57,049 against 37,141 for 1921. The syllabus on Rubber prepared for use in our lecture work with large groups of children received such a warm welcome and was so much in demand that syllabi on Coffee and Tea were prepared. Every member of a class coming to hear a lecture on these subjects is presented with a syllabus. In this way we feel that the lesson has been made more valuable for both the children and the teachers, in that they have to carry back with them, in printed form, the main facts which the subject covered. Such a syllabus is planned to be of a size that fits into the pupil's regulation notebook.

Material has been distributed to 1,595 teachers, which, in its class use, has reached 67,757 children. This material is in the form of mounts, twigs, plants, flower materials, etc. The time of the Curator has been so taken in conference with teachers in regard to work and methods of presenting such work in the classroom that it seemed only right that some account should be kept of such demands. During 1922, 49 individual and group conferences were held by request with 4,187 teachers, and the plans worked out in such conferences for class work in nature study affected 116,712 children. These conferences varied in time limit from one half hour to sometimes two and three hours. Some unusual educational work has been asked of us during 1922. Groups of children from some of our elementary schools have been coming once a week for a given number of weeks. Work given to them in the field, classroom, and greenhouses is used later by the teachers as a basis for

oral English. It is believed by some of the principals that our type of work offers one of the finest of opportunities for rich work in oral English. The Bellevue Hospital, Manhattan, requested us to come monthly to one of their psychopathic wards for nature work with the children. The Mineola Home for Cardiac Children asked for assistance with their outdoor garden. The Curator went to the Home, looked over the piece of land, and made plans for the work; then two of the assistants in the department took charge of the actual staking out of the garden and gave the first garden lessons. The department presented the seeds for the work and tomato plants raised by our own boys and girls.

The Curator of Elementary Instruction and her assistants have given 39 lectures this year, and the Curator alone has been obliged to refuse about 40 lecture requests on account of pressure of other Garden work. Just at this point it might be well to state the total attendance figures for all classes and lectures given by this department, which figure is 74,243, an increase of nearly 15,000 over the total attendance for 1921. Our seed work has remained about normal: we have reached 4,053 teachers and 76,528 children. In all our activities, including regular classes, visiting classes, seed work, conferences, loan lectures, and material distributed, we have come in touch with approximately 10,917 teachers and with 240,789 children.

Equipment

This year we have added to our equipment three moving-picture reels purchased from the Commercial Museum of West Philadelphia, and from the same source five drawers from a loan collection cabinet which the State of Pennsylvania authorizes the Commercial Museum to arrange for the schools of that State. The drawers show such important commercial materials as corn, rice, cotton, silk, and flax. These exhibits have been used in connection with the geography work done in the grade schools of the Borough of Brooklyn.

A special room has been set aside as permanent quarters for the seed work. Equipment for the room has been worked out from our experiences of the last nine years. Shelves of the right height for packing and filling, special bins to hold seeds and filled packets,

and shelving space have been arranged so as to add materially to the efficiency of the work.

The Boys' and Girls' Club room, a gift of Mrs. George D. Pratt, was opened during the spring of 1922. This room has been a great help and offers another opportunity for intensive educational work. Every Saturday some exhibit which is a part of our nature or garden work is placed in the room. Boys and girls are assigned to explain such exhibits to the younger children or the general public. The care and control of the room is under a committee of boys and girls. Each Saturday morning two investigators are appointed to go through the greenhouses, seek out whatever plants seem to be of special interest, make notes about such plants, dictate a notice and post it on the bulletin board, then act as guides through the greenhouses.

Departmental Changes

Miss Edna Burtis, who graduated from our normal course for teachers of children's gardening and nature study in 1917, and who was made instructor March 1, 1919, resigned on March 31, 1922. The vacancy was filled on April 1, 1922, by the appointment of Miss Edith R. Sanders. Miss Sanders graduated from the Lowell (Mass.) High School and also from Wheaton College (Norton, Mass.) in 1916, and from the State Normal School at Lowell in 1918, taking special studies there in 1919. From March, 1919, to June, 1921, she was assistant supervisor of nature study at Newton, Mass., and from September, 1921, to April 1, 1922, science teacher in the Junior High School, Hackensack, N. J.

Miss Eugenie Blank, a graduate of our first teachers' class (1914) and for four years connected with the department, resigned June 30. Her position was filled July 1 by Miss Maude L. Hickok, of the Botanic Garden teachers' class of 1916. Miss Hickok was teacher of gardening at the Fairview Garden School, Yonkers, N. Y., 1917–19; laboratory assistant, Brooklyn Botanic Garden, 1919–20; and teacher of nature study, Washington, D. C., public schools, April, 1920–July, 1922.

It is fitting here to express appreciation of the work and loyal support of Miss Blank and Miss Burtis.

In closing this report, I should like to call to your attention the

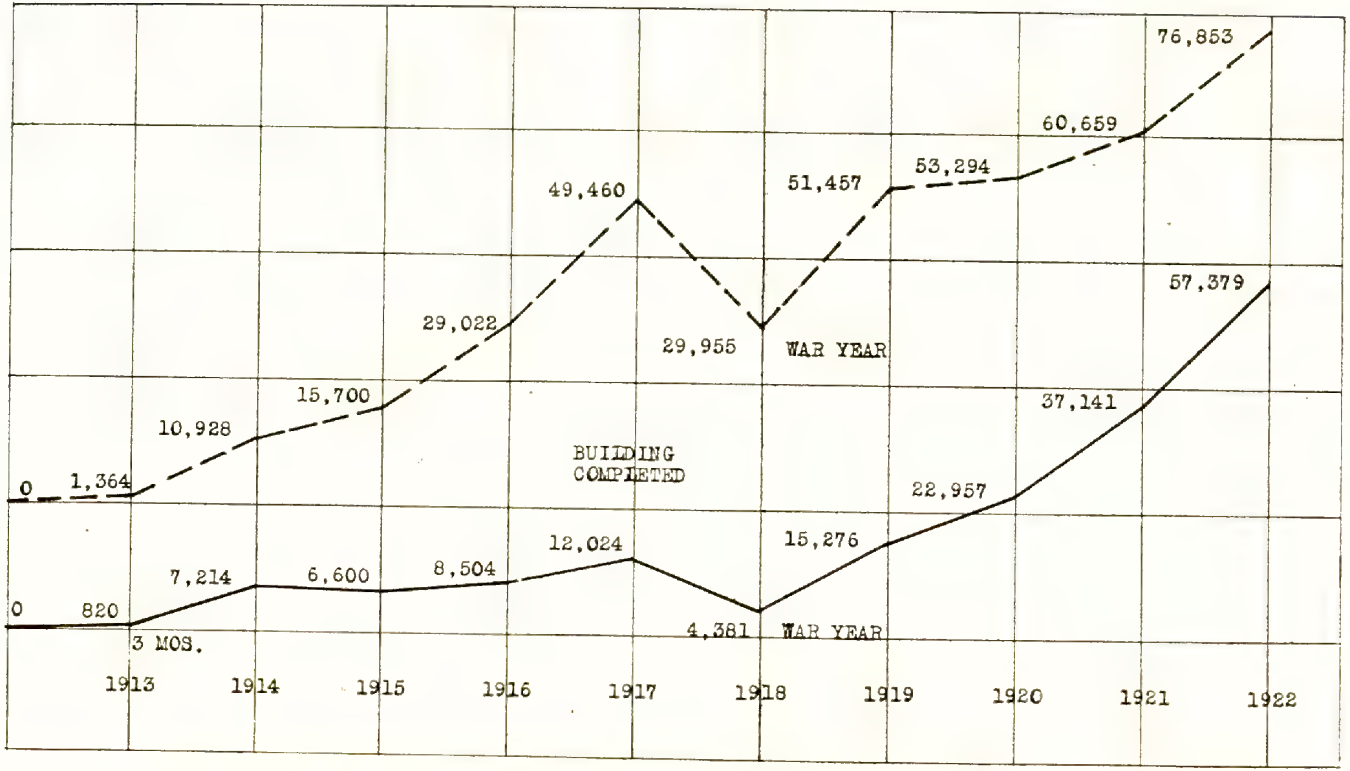

FIG. 10. Curves of attendance at elementary classes and lectures, during the first ten years of the work.

The upper curve shows the total attendance at all classes and lectures, October, 1, 1913–December 31, 1922. The drop in 1918 was occasioned by circumstances incidental to the war.

The lower curve shows the attendance of visiting classes, with teachers, from public and private schools of Brooklyn from October 1, 1913–December 31, 1922. The drop in 1918 was due to restriction in numbers necessitated by War Garden demonstrations.

following point, namely: that, while this is the tenth annual written report from this department, its tenth year is not completed until the first of October, 1923; as the first annual report covered only October, November, and December of 1913.

Respectfully submitted,

ELLEN EDDY SHAW,
Curator of Elementary Instruction.

REPORT OF THE LIBRARIAN FOR 1922

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as librarian for the year ending December 31, 1922.

In a résumé of the larger tasks accomplished in this department during the past year, the most important is the completion of the shelf list and catalogue of the serial collection. This will materially facilitate the work of checking trade catalogues, and will lessen the probability of duplication when ordering new titles. As soon as the revision and filing of these cards are completed, an inventory of the collection can be taken, which will enable us to obtain accurate figures regarding the number of volumes in the collection. As the work on the serial shelf list and catalogue has extended over a period of six years, an inventory count of the serial volumes is planned during 1923.

Over 400 volumes were prepared for binding, of which 350 were completed volumes of serial publications; sixty-nine new periodicals were added to our current periodical file, and the exchange list has been enlarged by 57, of which 45 are received from foreign countries; an inventory was taken of the classified collection (*i.e.*, excluding serial volumes and unclassified pamphlets), which includes 3,000 accessioned volumes and 412 pamphlets. Six titles are missing, but this number has not yet been deducted from the total, as the titles may still be found; ninety-three pamphlets were withdrawn from the alphabetically arranged pamphlet collection and shelved with the classified collection, as it was thought these would be more useful shelved by subject; the remainder of the unbound pamphlets from the pamphlet collection, 396 in number,

were stapled into Gaylord pamphlet pressboard binders. Authors' names and titles were printed on the front covers to facilitate shelving and finding them. This completes the binding into pressboard covers of the entire pamphlet collection, consisting of 5,998 pamphlets; in reply to our letters to the agricultural experiment stations, and various U. S. departments, we received 868 publications lacking from our shelves. We were especially gratified to receive these, as they included earlier numbers, so difficult to obtain at present.

Accessions

The total accessions for the year 1922 were 988 volumes, of which at least one third were received as exchanges or gifts, and 37 by binding completed volumes of serials; 556 pamphlets, 207 of which were forwarded as exchanges and 192 donated to the library; and 6,033 parts of publications, including current periodicals, of which over 3,900 were received as exchanges.

There were deducted, from the pamphlet count, 38 non-botanical titles, which had been included in the Dublin gift of 1914, and which have been transferred as follows: Five to the Brooklyn Museum Library; five to the Brooklyn Public Library; seventeen to the Station for Experimental Evolution, Cold Spring Harbor. Eleven were shelved with our duplicates.

The more important accessions for the year are listed herewith: *American Agriculturist,* 10 vols.; *Botanisches Centralblatt* and *Beihefte,* 146 vols.; Carnegie Institution of Washington, Publications, 28 vols.; *Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten,* 2te Abt., 10 vols.; Herbier Boissier, *Bulletin,* 16 vols.; *Hooker's Botanical Miscellany,* 18 vols.; *Horticulturist and Journal of Rural Art and Taste,* 13 vols.; Royal Irish Academy, *Proceedings,* Section B, 11 vols.; *Journal de botanique,* 20 vols.; *Journal of Botany, British and Foreign,* 36 vols.; Karsten & Schenck, *Vegetationsbilder,* 10 vols.; Koorders, *Excursionsflora von Java,* 3 vols.; Lamarck, *Encyclopédie Méthodique: Botanique,* 13 vols.; Lindau & Sydow, *Thesaurus Litteraturae Mycologicae et Lichenologicae,* 3 vols.; Linné, C., *Amoenitates Academicae,* 10 vols.; Linnean Society of London, *Transactions,* 2d ser., *Botany,* 7 vols.; Royal Society of London, *Philosophical Transactions,*

1665–1800, 18 vols.; Miller, *Gardener's and Botanist's Dictionary,* 4 vols.; Linnean Society of New South Wales, *Proceedings,* 6 vols.; *Natural History of New York,* 17 vols.; *Nyt Magazin for Naturvidenskaberne,* 5 vols.; *The Phytologist,* 17 vols.; Société Royale de Botanique de Belgique, *Bulletin,* 6 vols.; Royal Society of South Africa, *Transactions,* 9 vols.; Thomé, *Flora von Deutschland, Oesterreich und der Schweiz,* 13 vols.; Tournefort, P., *Démonstrations Élémentaires de Botanique,* 12 vols.; U. S. Dept. of Agriculture, Report of the Secretary, 3 vols.; U. S. National Museum, Reports, 21 vols.; Wood & Evans, Natal Plants, 6 vols.

We have added to the pre-Linnaean collection nine titles, including one incunabulum, all of which have been purchased with the income from the Benjamin Stuart Gager Memorial Fund given primarily for this purpose. We list them herewith:

Alpini, *De Plantis Exoticis,* 1656; Arnoldus de Nova Villa, *Tractatus de Virtutibus Herbarum* [1499]; Clusius, *Caroli Clusii Atrebatis . . . Exoticorum Libri Decem,* 1605; Clusius, *Rariorum Plantarum Historia,* 1601; Fuchs, *Plantarum Effigies . . .,* 1552; Linné, *Hortus Cliffortianus,* 1737; Lobel, *Icones Stirpium seu Plantarum tam Exoticorum,* 1591; *Ortus Sanitatis,* 1536; Plinius Secundus, *Cajus, Historia Mundi Naturalis,* 1582.

Eight volumes of the earlier annual reports were received from the New Hampshire Horticultural Society; sixteen volumes from the Cornell Agricultural Experiment Station; seven from Maine; the 1st, 2d, 3d, 7th, 11th, 12th from Colorado; and four annual reports covering the years 1896–1900 from Wyoming.

Periodicals

The current periodical file has been enlarged by sixty-nine new titles, thus making the total number received in the library 598. The interesting fact in connection with the new titles is that 57 of the 69 are forwarded us through the initiation of exchanges with Brooklyn Botanic Garden publications, and that five of these are subscriptions.

Some of the new titles are: Publications of the Carnegie Institution of Washington; *Bulletin* of the Cleveland Museum of Natural History, as well as the *Pocket Natural History,* Botanical

series; *Leaflet* of the Field Museum of Natural History; *Bulletin* of the Lloyd Library, Entomological series; *Technical Bulletin* of the Minnesota Agricultural Experiment Station; *Quarterly Bulletin* of the State Plant Board, Mississippi; *Moving Picture Age; Nature Magazine;* Annual Report of the New Hampshire Horticultural Society; Report of the Department of Plant Physiology of the New Jersey Agricultural Experiment Station; *Proceedings* of the Rochester Academy of Science; *Roosevelt Wild Life Bulletin,* Roosevelt Wild Life Forest Experiment Station; *Atlas of American Agriculture,* U. S. Department of Agriculture; *Transactions* of the Wisconsin Academy of Sciences, Arts and Letters; *Farm and Garden,* Woman's National Farm and Garden Association; *World Agriculture;* University of Wyoming, Publications in Science, Botany.

The wide geographic scope of the 49 newly added foreign periodicals is a feature which should not be overlooked, especially in view of the fact that 45 are received in exchange for our publications, thus placing the Garden in direct contact with institutions in South Australia, New Zealand, Federated Malay States, Dutch East Indies, Mesopotamia, Straits Settlements, South Africa. We enumerate a number of them:

Archiv für Rassen-und Gesellschaftsbiologie, Munich; *Bulletin* of the Department of Agriculture of South Australia; *Beiträge zur Pflanzenzucht; Botanisches Archiv, Zeitschrift für die gesamte Botanik,* Königsberg; *Memoirs* of the Department of Mines, Canada; *Canadian Horticulturist,* Floral edition; Publications of the Cawthron Institute of Scientific Research, Nelson, New Zealand; *Bulletin d'Informations du Jardin et Musée Botaniques de l'Université de Cluj, Rumania; Contributions Botaniques de Cluj.*

Danske Videnskabernes Selskab, Biologiske Meddelelser, Copenhagen; Difesa Sociale, Rome; Notes from the Botanical School of Trinity College, Dublin; Malayan Agricultural Journal, Federated Malay States; Miscellaneous publications from Funchal, Portugal; Publications of L'Herbier Boissier, Université de Genève, Switzerland; Dissertations, Giessen University, Germany; Vegetationsbilder, Jena: Hereditas, Genetiskt Arkiv, Lund, Sweden; Publications, Universidad del Cuzco, Peru.

Publications of the Bengal Institute of Arts and Sciences, India; Memoirs of the Department of Agriculture in India, Pusa, India; *Proceedings* of the Royal Irish Academy, Section B, Dublin, Ireland; *Japanese Journal of Botany,* Tokyo, Japan; *Bulletin Joseph Paquet,* Nice, France; *Bulletin, Mededeelingen,* and *Vlugschrift van het deli Proefstation,* Medan-Sumatra, Dutch East Indies; Report of the Department of Agriculture, Baghdad, Mesopotamia; Publications of the Museo Nacional de Historia Natural, De Jaurez, Mexico; *Le Stazioni Sperimentali Agrarie Italiane, Organo Ufficiale,* Modena, Italy.

Report of the Forestry Commission of New South Wales; *Bulletin* of the Imperial Central Agricultural Experiment Station in Japan; *Annali della Regia Scuola Superiore di Agricoltura in Portici,* Italy; *Proceedings* of the Royal Society of Queensland; *Review of Applied Mycology,* Kew, England; *Revue de Botanique Appliquée & d'Agriculture Coloniale, France; Boletin, Memoria,* and *Revista de Agricultura* of the Estado de Agricultura e Inmigracion, Santo Domingo; *Bulletin de la Société botanique de France; Bulletin de la Société Royale de Botanique de Belgique.*

Transactions of the Royal Society of South Africa; *Science Bulletin* of the Department of Agriculture of the Union of South Africa; Annual Report of the Director of the Gardens, Straits Settlements; Bulletin, Sutton & Sons, Reading, England; *Annali della R. Accademia d' Agricoltura di Torino, Italia; Bulletin de la Société d'Histoire Naturelle de Toulouse; Boletin del Ministerio de Fomento, Venezuela;* Publications, Naturhistorischen Museums, Vienna, Austria.

Inter-library Loans

The Garden library loaned 24 publications during the year to the Brooklyn Museum, Columbia University, Carnegie Institution, Cold Spring Harbor, L. I.; Rockefeller Institute, New York; Biological Laboratory, Cold Spring Harbor, L. I.

In accordance with our annual custom, the desired collection was forwarded to the Biological Laboratory, Cold Spring Harbor, for the use of their students during the summer session.

We borrowed 87 volumes, as compared with 41 last year, for the use of the staff from the Brooklyn Museum Library, Brooklyn

Public Library, Massachusetts Horticultural Society, American Museum of Natural History, Columbia University, American Geographical Society, New York Public Library, Cornell University Library, Library of the U. S. Dept. of Agriculture, and the Library of the U. S. D. A., Bureau of Plant Industry.

Binding

Of the 417 volumes prepared for the binder, 350 were completed volumes of serial publications; 285 Bulletins of the U. S. Bureau of Plant Industry, 450 Farmers' Bulletins, and 210 U. S. Department Bulletins were bound into volumes, generally consisting of 25 numbers.

Miscellaneous

The Students of the Junior Class of the New York Public Library, conducted by Miss Edith W. Tiemann, made their annual visit to the Garden on October 6. The librarian gave a talk on the methods used in the organization and work of the library of the Brooklyn Botanic Garden. Tea was served in Room 306, where the director addressed the class on the work of the Garden. They were then taken over the grounds by Dr. Gundersen.

Since May 22, Miss Berry was transferred from 4 to 5 p.m. from the library to Dr. Graves's work. The library has had Miss Donegan as a full-time assistant, and Miss Berry, mornings, from nine until twelve, five days a week. We could easily use to advantage two full-time assistants, due to the growth and use of the library, and the increased amount of work which necessarily follows.

Exhibits of decorative books were shown at the annual receptions of the Garden.

The Garden was represented at the New York Library Club, New York Library Association, and the New York Special Library Association.

Summary

The preparation of the foreign order, consisting of 243 volumes and 73 pamphlets, was completed. The pamphlets have been catalogued and shelved. The cataloging of the 243 volumes was left for 1923, so that the shelf list and catalogue of back serials could be completed this year.

FIG. 11. Boys and Girls Club, April meeting. Older members instructing new members in the implements and steps taken in gardening.

Letters were forwarded to each agricultural experiment station and to various U. S. Departments for old numbers of titles still missing from our shelves. We added in this way 732 early volumes of annual reports and bulletins from the agricultural experiment stations and 136 U. S. publications. The receipt of the U. S. bulletins made it possible for us to forward to the binder some sets of early Departmental Bulletins and Farmers' Bulletins of the U. S. Dept. of Agriculture.

A reference question file has been begun, which now includes 91 subject entries. These entries include the source where the information wanted was found. This will eliminate the necessity of looking up certain reference questions more than once.

During the early part of the year unbound publications on the agricultural experiment station shelves, as well as U. S. unbound documents, were rewrapped and relabeled in over 600 manila wrappers and over 140 envelopes.

As a practical aid in locating and shelving serial publications, arranged in alphabetical order, over 130 shelf labels were made with gummed black letters. Almost as many more are needed to cover the remainder of the collection.

New labels were typewritten for the current periodical shelves, current agricultural experiment station shelves, shelf list, catalogue, and Torrey Botanical Club card files. New black letter labels for the classified book collection were made.

For list of donors and gifts, see Appendix 1.

The statistical report follows:

STATISTICAL REPORT ON THE LIBRARY

Accessions

	Volumes	Pamphlets	Parts (Including Periodicals)
Exchange	146	207	3,910
Gift	180	192	1,476
Publication	0	74	210
Purchase	625	83	431
Bindery	37	0	0
Deposit	0	0	6
Total	988	556	6,033

Total number of parts of publications added to library during 1922, including current periodicals	6,033
Total number of volumes reported, December 31, 1921	7,660
Total number of volumes added during 1922	988
Total number of volumes in the library December 31, 1922	8,648
Total number of pamphlets in library December 31, 1921	5,480
Total number of pamphlets added during 1922	556
	6,036
Minus 38 non-botanical pamphlets transferred to various institutions.	38
Total number of pamphlets in library December 31, 1922	5,998
Total number of volumes and pamphlets in library December 31, 1921.	13,140
Total number of volumes and pamphlets added during 1922	1,544
	14,684
Minus 38 non-botanical pamphlets transferred to various institutions.	38
Total number of volumes and pamphlets in library December 31, 1922.	14,646

Serial Publications

Count of Periodicals, State and Federal Documents, and Society Publications Currently Received During 1922:	
Subscription	63
Gift	58
Exchange	468
Deposit from Brooklyn Public Library	2
Publication	7
Total	598
Increase	69

Miscellaneous Statistics

Torrey Botanical Club index cards on file in the library December 31, 1921	29,750
Added by purchase during 1922	1,350
Total number of Torrey Botanical Club index cards on file December 31, 1922	31,100
Index Algarum Universalis cards, December 31, 1921	15,604
No cards received during 1922.	
Cards added to shelf list	1,182
Cards added to dictionary catalog	2,013
Cards added to pamphlet catalog	637
Cards added to current periodical catalog	200
Cards added to catalog of duplicates	274
Total typewritten cards	4,306

Books loaned to members of staff	1,194
Number of readers in library, approximately	2,990
Volumes entered in accession book	988
Number of letters written	264
Books loaned to other institutions	24
Books borrowed from other institutions	87
Lantern slides on file December 31, 1921	2,998
Lantern slides accessioned during 1922	409
Total number of lantern slides on file December 31, 1922	3,407
Photographic negatives on file December 31, 1921	3,819
Negative accessioned during 1922	566
Total number of negatives on file December 31, 1922	4,385

Respectfully submitted,

RAY SIMPSON,
Librarian.

REPORT ON THE CRYPTOGAMIC HERBARIUM

DR. C. STUART GAGER, DIRECTOR.

Sir: I beg to submit herewith the Annual Report on the Cryptogamic Herbarium for the year 1922.

The following table (p. 81) shows the number of specimens received, their source, and other pertinent information:

Mrs. Annie Morrill Smith presented to the Garden valuable lists, letters, etc., pertaining to mosses and hepatics collected at Chilson Lake, Essex Co., New York, a set of which is in the Cryptogamic Herbarium, presented to the Garden by Mrs. Smith several years ago.

Special note may be made of the collection of Rusts and Smuts received in exchange from the Office of Pathological Collections of the U. S. Department of Agriculture. The Garden has received practically a complete set of the specimens prepared for exchange by that office.

By far the most important single addition ever made to the Cryptogamic Herbarium is the excellent mycological collection of Dr. Franz Bubák, formerly Director of the Botanical Garden at Tabor, Czecho-Slovakia. The collection includes a total of 33,779

ACCESSIONS TO THE CRYPTOGAMIC HERBARIUM, 1922

Date	No. of Specimens	From	How Acquired	Remarks
		Mosses		
Feb. 8..	162	A. H. Brinkman	Purchased	Bryophytes—Canada
10..	24	J. M. Holzinger	Purchased	Mosses—N. America
27..	1	Mrs. Annie Morrill Smith	Gift	Moss—Massachusetts
Mar. 11..	10	N. Taylor	Collected	Mosses—Mt. Desert Is.
June 5..	25	J. M. Holzinger	Purchased	Mosses—N. America
Aug. 28..	6	Miss A. E. Hamilton	Gift	Mosses—Long Island
Total..	228			
		Fungi		
Mar. 1..	200	E. Bartholomew	Purchased	N. A. Ured. Cent. 26, 27
July 19..	30	J. J. Brenckle	Purchased	Fungi Dakotensis Fasc. 21
25..	500	H. Sydow	Purchased	Mycotheca germanica Fasc. 27–36
Aug. 30..	940	Office of Pathological Collections U.S.D.A.	Exchange	Rusts and Smuts
Oct.	33,779	Dr. F. Bubák	Purchased	Mycological collection
Dec.	86			Local collections
Total..	35,535			

specimens, most of which are arranged in 139 fascicles. The following table indicates the distribution of the species and specimens in these fascicles:

	Species	Specimens
Myxomycetes	66	153
Basidiomycetes	1,230	3,911
Ascomycetes	2,139	5,846
Hemibasidii	267	1,775
Uredinales	1,437	10,611
Imperfecti	2,796	7,102
Phycomycetes	192	2,150
	8,127	31,548

The remaining specimens had not been distributed by Dr. Bubák into his fascicles.

The collection includes a number of very important exsiccati. The principal ones are as follows:

Jaap, Fungi selecti exsiccati	Fasc.	1–34 complete
Kabat & Bubák, Fungi Imperfecti exsiccati	Fasc.	1–8 complete
Krieger, Fungi saxonici	Fasc.	41–48
Krieger, Schädliche Pilze	Fasc.	1–5
Komarov-Tranzschel, Fungi Russiae	Fasc.	1–5
Maire, Hypodermaceae gallione	Complete	
Sydow, Fungi austroamericani	Fasc.	1–18 complete
Sydow, Fungi exotici exsiccati	Fasc.	1–9 complete
Sydow, Ustilagineen	Fasc.	1–13
Sydow, Uredineen	All issued since 1900	
Sydow, Phycomyceten	Fasc.	1–9
Tranzschel-Serebrianikow, Myc. rossica	Fasc.	1–7
Vestergren, Micromycetes rariores selecti	Fasc.	10–72

Dr. Bubák has described a large number of new species of Fungi. All of his original or type specimens, to the number of about 500, are included in the collection. In addition, there are found all of his collections of fungi from Bohemia, Montenegro, Hungaria, Moravia, and other parts of Central Europe which have served as the basis for Dr. Bubák's numerous mycological publications.

The collection constitutes an extremely valuable addition to the Herbarium and greatly facilitates the work in connection with the parasitic fungi.

Respectfully submitted,

GEORGE M. REED,
Curator of Plant Pathology.

FINANCIAL STATEMENTS FOR 1922

I. Tax Budget Accounts

1360 *Personal Service*		
Appropriation		$71,241.00
Expended		71,241.00
1361 *Other Codes Than Personal Service*		
Appropriation		$15,373.20
Expended		15,373.20
Summary of Tax Budget Accounts		
Appropriation by City for maintenance		$86,614.20
Expended		86,614.20

II. Private Funds Accounts

1. *Endowment Fund* ($75,500.00) *Restricted in part:*

Income Account:		
Income, 1922		$ 4,011.86
Transferred to Special Contributions		4,011.86

2. *Life Membership Fund* ($4,500.00) *Restricted:*

Income Account:		
Balance, Jaunary 1, 1922		$ 14.59
Income, 1922		239.03
		$253.62
Expended	$ 75.03	
Transferred to Endowment Increment Fund	47.80	122.83
Balance, December 31, 1922		$ 130.79

3. *George C. Brackett Library Fund* ($500.00) *Restricted:*

Income Account:		
Balance, January 1, 1922		$ .65
Income, 1922		26.55
		$ 27.20
Expended	$ 7.79	
Transferred to Endowment Increment Fund	5.30	13.09
Balance, December 31, 1922		$ 14.11

4. *Benjamin Stuart Gager Memorial Fund* ($10,000.00) *Restricted:*

Income Account:		
Balance, January 1, 1922		$ 236.68
Income, 1922		905.20
		$ 1,141.88
Expended	$ 945.60	
Transferred to Endowment Increment Fund	180.00	1,125.60
Balance, December 31, 1922		$ 16.28

5. *Martha Woodward Stutzer Memorial Fund* ($5,000.00) *Restricted:*

Income Account:		
Balance, January 1, 1922		$ 12.01
Income, 1922		265.64
		$ 277.65
Expended	$ 96.44	
Transferred to Endowment Increment Fund	53.12	149.56
Balance, December 31, 1922		$ 128.09

6. *Mary Bates Spalding Fund* ($2,000.00) *Restricted:*

Income Account:		
Balance, January 1, 1922		$ 108.00
Income, 1922		85.00
		$ 193.00
Expended	$ 125.50	
Transferred to Endowment Increment Fund	$ 17.00	142.50
Balance, December 31, 1922		$ 50.50

7. *Cary Library Fund* ($10,000.00: 1/5 to B.B.G.) *Restricted:*

Income Account:		
Balance, January 1, 1922		$ 19.18
Income, 1922		106.25
		$ 125.43
Expended	$ 83.71	
Transferred to Endowment Increment Fund	21.25	104.96
Balance on hand, December 31, 1922		$ 20.47

8. *Special Fund (Brooklyn Institute General Endowment Income: Annual Allotment) Restricted:*

Income Account:	
Income, 1922	$ 2,880.00
Transferred to Special Contributions	2,880.00

9. *Botanic Garden Collections Fund, 1922. Restricted:*

Transferred from Collections Fund, 1921		$ 195.78
Received from contributions, 1922		7,908.76
		$ 8,104.54
Expended	$ 5,933.23	
Transferred to Special Contributions	1,597.75	7,530.98
Balance, December 31, 1922		$ 573.56

10. *Sustaining Membership. Restricted:*

Balance, January 1, 1922		$ 164.23
Received from dues, 1922		376.86
		$ 541.09
Expended	$ 399.90	
Transferred to Endowment Increment Fund	75.37	475.27
Balance, December 31, 1922		$ 65.82

11.	*Annual Membership. Restricted:*		
	Balance, January 1, 1922		$ 113.21
	Received from dues, 1922		1,260.00
			$ 1,373.21
	Expended	$ 986.01	
	Transferred to Endowment Increment Fund	254.17	1,240.18
	Balance, December 31, 1922		$ 133.03
12.	*Tuition and Sales. Restricted:*		
	Balance, January 1, 1922		$ 2,805.16
	Received, 1922:		
	(a) Instruction	$ 2,479.89	
	(b) Penny seed-packets	2,800.33	
	(c) Incidentals	416.79	5,697.01
			$ 8,502.17
	Expended	$ 4,901.70	
	Transferred to Endowment Increment Fund	1,095.23	
	Transferred to Special Contributions	1,000.00	6,996.93
	Balance, December 31, 1922		$ 1,505.24
13.	*Special Purposes. Restricted by terms of gift:*		
	Special gift for Japanese Garden:		
	Received		$ 500.00
	Expended		500.00
14.	*Special Contributions.* (For 1922 only)		
	Transferred from Endowment Fund Income Account		$ 4,011.86
	Transferred from Special Fund		2,880.00
	Transferred from Special Account W		6,750.32
	Transferred from Tuition and Sales		1,000.00
	Transferred from Collections Fund, 1922		1,597.75
			$16,239.93
	Expended		16,239.93
15.	*Special Account W. Restricted:*		
	Income Account:		
	Balance, January 1, 1922		$ 317.14
	Income, 1922		12,440.86
			$12,758.00
	Expended	$ 3,478.41	
	Transferred to Special Contributions	6,750.32	
	Transferred to Endowment Increment Fund	2,488.17	12,716.90
	Balance, December 31, 1922		$ 41.10

16. *Plant Pathology Research Fund. Restricted.*

Balance, January 1, 1922	$ 427.78
Income, 1922	10,000.00
	$10,427.78
Expended	10,427.78

17. *Endowment Increment Fund. Restricted.*

Income Account:	
Transferred from other accounts, 1922	$ 4,237.41
Interest, 1922	274.11
	$ 4,511.52
Transferred to Principal	4,511.52

Summary of Private Funds Accounts:

Balance, January 1, 1922	$ 4,414.41		
Income, 1922	46,977.13		$51,391.54
Expended	$44,201.03		
Transferred to Endowment Increment Principal	4,511.52	$48,712.55	
Balance on hand December 31, 1922		2,678.99	51,391.54

APPENDIX 1

GIFTS RECEIVED DURING 1922

Collections Fund

Mr. Frank Bailey
Dr. and Mrs. Glenworth R. Butler
Mr. Isaac H. Cary
Mr. William C. Courtney
Mr. Walter H. Crittenden
Mr. O. Ebel
Mr. Julian Fairchild
Mr. John W. Frothingham
Mrs. William H. Good
Mrs. A. Augustus Healy
Mr. Henry W. Healy
Mr. and Mrs. James M. Hills
Mr. E. R. Kennedy
Mrs. J. H. Lester
Miss Hilda Loines
Mrs. John Bradley Lord
Mr. William G. Low
Mr. Frank Lyman
Mr. Horace J. Morse
Mr. William H. Nichols
Mr. Wm. A. Putnam
Mrs. Wm. A. Putnam
Dr. E. H. Squibb
Mr. Herman Stutzer
Miss Mary Van Norden
Mr. Edwin G. Warner
Miss F. E. White
Miss H. H. White
Mr. Harold T. White
Miss Mary B. Woodward

Living Plants

Mr. Frank Bailey (2)
Prof. Henry C. Cowles (1)
Mr. Elias H. Bartley (14)
Mr. Henry Reppa (1)
Miss Alice Rathbone (1)
Mrs. H. K. Alt-Müller (1)
Mr. J. W. Burley (1)
Mr. E. S. Miller (3)
Davenport Nurseries (1)
Schubert Brothers (5)
Mr. Irving Holcomb (5)
Mr. H. H. Haradon (1)
Mr. C. H. Wiemuth (4)
Isaac Hicks & Son (184)

Phanerogamic Herbarium

American Museum of Natural History, from the Whitney South Sea Expedition.
326 specimens collected in the Society Islands.

Mr. N. Ballalas, Athens. (Through the New York University.)
96 specimens collected on Mt. Athos, Greece.

Miss A. E. Hamilton, Baldwin, Long Island.
1,245 specimens, most of which are from Long Island.

Mr. F. L. Hoffman, Prudential Insurance Company, Newark, New Jersey.
24 specimens from South America.

Mr. Edward B. Chamberlain, 18 West 89th Street, New York City.
Conopholis americana, collected west of Bear Mt.

Mr. William C. Ferguson, 37 Atlantic Avenue, Hempstead, Long Island.
149 specimens, most of which are from Long Island.

Dr. F. A. Lucas, American Museum of Natural History.
One fruit of Acorn Squash (*Cucurbita maxima*).

Cryptogamic Herbarium

Mrs. Annie Morrill Smith, Bronxville, N. Y.

Miss A. E. Hamilton, Baldwin, L. I.
1 specimen of moss.
6 specimens of mosses.

Seeds

Mr. Frank Bailey (12)
Miss Louise Holske (1)
Mr. H. L. Bridgman (3)
Miss Fallkersa (1)
Mrs. Farwell (1)
Professor Juan Balme (2)
Mr. Edward Hogg (2)
Mr. John Nowak (1)
Mr. W. B. Baker (1)

Library

Books

American Scenic and Historic Preservation Society	2
Dr. H. L. Bridgman	1
Brooklyn Museum Library	42
Mrs. G. Burkhardt	1
Mrs. Glentworth R. Butler	19
Carnegie Institution of Washington	34
Dr. C. S. Gager	9
Miss Anna Marie Gissel	1
Dr. Frederick L. Hoffman	34
Mrs. Alice Earl Hyde	4
Indiana Department of Conservation	1
Dr. Marguerite T. Lee	1
Miss Olivia Massarene	1
Michigan Department of Conservation	3
Mr. Barrington Moore	2
New York (State) Department of Farms and Markets	1
Mr. Porter Sargent	1
Mrs. Annie Morrill Smith	1
Mr. H. Guthrie Smith	1
Dr. Homi Shirasawa	3
Smithsonian Institution	7
Dr. Roland Thaxter	1
U. S. Department of Agriculture	3
U. S. Department of Agriculture, Library	1
U. S. National Museum	21
Dr. O. E. White	1
Mr. John Wille	2
The Wilmer Atkinson Co.	1
Total	199*

Pamphlets

Prof. F. M. Andrews	29
Mr. C. E. Behre	1
Dr. Guido Borghesani	7
Prof. C. L. Bristol	1
Brooklyn Museum Library	5
Carnegie Institution of Washington, Cold Spring Harbor, L. I.	24
Mr. Oliver Atkins Farwell	3
Dr. C. S. Gager	33
Dr. A. H. Graves	4
Prof. C. T. Gregory	1
Hokkaido Imperial University	3
Dr. Theodor Holm	3
Prof. John Holzinger	1
Miss Aniela Kozlowska	1
Mr. Barrington Moore	12
Mr. Bogumil Pawlowski	1
Dr. M. P. Porsild	5
Dr. H. H. Rusby	1
Miss Ellen Eddy Shaw	4
Dr. N. E. Stevens	8
Mr. D. Szymkiewicz	1
Prof. Roland Thaxter	41
Dr. N. I. Vavilov	1
Mr. Oscar Weigel	1
Dr. O. E. White	1
Total	192

Parts of Publications Exclusive of U. S. Government Publications

Prof. L. H. Bailey	1
Dr. R. C. Benedict	1
Bernice P. Bishop Museum	1
Dr. H. L. Bridgman	1
Brooklyn Museum Library	34
Cambridge Botanic Garden	1

* The number of volumes received as gifts is not necessarily the number accessioned during the year. Some may be unrelated to our subjects, and may have been transferred to other institutions in exchange.

Chile, Sociedad Agronomia de Chile	3
Brooklyn Institute of Arts and Sciences, Cold Spring Harbor	8
Mr. J. A. Faris	69
Dr. C. S. Gager	94
Georgia Agricultural Experiment Station	42
Dr. A. H. Graves	5
Dr. Alfred Gundersen	3
Dr. Frederick L. Hoffman	10
Michigan Agricultural College.	18
Mulford Biological Exporation.	1
New York Academy of Sciences	52
New York (City) Department of Health	64
New York (State) Department of Farms and Markets	10
New York School Garden Association	1
Mr. Joseph Paquet	1
Philadelphia Commercial Museum	1
School Garden Association of New York	1
Miss Ellen Eddy Shaw	1
Mrs. Annie Morrill Smith	7
Dr. Homi Shirasawa	177
Smithsonian Institution	1
South Carolina, University of..	1
Sociedad cientifica Antonio Alzate	3
The Misses White	6
Total	588

Portraits

Dr. J. Arthur Harris	1
Prof. Duncan S. Johnson	1
Prof. L. E. Melchers, portrait of Prof. W. A. Kellerman..	1
Prof. J. H. Schaffner	1
The Misses White, framed portrait of Mr. Alfred T. White	1
Total	5

To the Department of Elementary Instruction

Bailey, Mr. Frank, Delphinium seed.

Boys' & Girls' Club, $35 for the support of our French orphan. Gavel for the use of the Club and of the Brooklyn Botanic Garden.

Burkhardt, Mrs. G., One book for the children's room, "A Journey to the Garden Gate."

Burtis, Miss Edna L., $10.

California Walnut Growers Association, Seventeen photographs on the walnut industry.

Gager, Dr. C. Stuart, Two books for the children's room, "A First Book of General Science"; "The Food and Game Fishes of New York."

Home and School Association, Hazel Avenue School, West Orange, N. J., One pair of candlesticks for the children's room.

Lee, Dr. Marguerite T., One book for the children's room, "The Garden Blue-book."

Massarene, Miss Olivia, One book for the children's room, "Nature's Garden."

Pond, Miss P. F., One flower bowl for the children's room.
Schmacke, Mr. Charles, One book for the children's room, "Human Side of Plants."
Schmacke, Mr. John, One book for the children's room, "Human Side of Trees."
Wille, Mr. John, Two books for the children's room, "Making Horticulture Pay"; "Farm Crops."
Darragh, Smail & Co., Ltd., New York City, One cocoa mat, and raw material of cocoa industry.
Klein, Mrs. Annie E. H., Brooklyn, $5 for the children's room.

Miscellaneous

Anonymous, for improvement of Japanese Garden, $500.
American Museum of Natural History, New York City. 8 Halftone cuts.
Britton, Mrs. E. G., Bronx, New York City. 2 Lantern slides.
Stüven, Rudolph, Glenside, Pa. 1 colored picture of a Japanese Garden.
Taylor, Miss Anna Heyward, Columbia, S. C. 3 pieces of batik work with floral designs.
Woman's Auxiliary of the Brooklyn Botanic Garden. 1 Italian flower bowl.

APPENDIX 2

PUBLICATIONS OF MEMBERS OF STAFF DURING 1922

Benedict, R. C.

——The Nephrolepis chart. *Gard. Chron. of America* **26**: 2. Feb. Printed also under various titles as follows:
The Genealogy of Nephrolepis. *The Garden* **86**: 96. Feb. 25.
Brooklyn Botanic Garden fern chart. *Flower Grower* **10**: 53. Mar.
Family tree of Boston fern. Horticulture **35**: 197. Apr. 25.
The Boston fern and its sports, by G. Thommen. *Florists' Exchange* **53**: 1071. Apr. 29.

——The Origin of new varieties of Nephrolepis by orthogenetic saltation. *Amer. Jour. Bot.* **9**: 140–157. Mch. Reprinted as *Brooklyn Bot. Gard. Contr.* No. 27. Mar.

——Game laws for ferns and wild flowers. *Amer. Fern Jour.* **12**: 33–45. Apr.–Je. (Reprinted with special cover and subtitles.)

—— Recent fern literature. *Amer. Fern Jour.* **12**: 58–60. Apr.–Je.

—— Polypodium vulgare as an epiphyte. *Amer. Fern Jour.* **12**: 63–64. Apr.–Je.

—— Evolution as illustrated by ferns. *Brooklyn Bot. Gard. Leaflets* **X**[3]. May 3.

—— Ferns as house plants. *Amer. Fern Jour.* **12**: 77–92. July–Sept. (Reprinted as *Brooklyn Bot. Gard. Leaflets* **X**[9–10]. Oct. 18.)

—— Variations in ferns. *Amer. Fern Jour.* **12**: 93–96. July–Sept.

—— Ferns in the news—what ferns should be protected in your state? *Amer. Fern Jour.* **12**: 98–99. July–Sept.

—— A Campaign for wild plant conservation. *Amer. Fern Jour.* **12**: 131–133. Oct.–Dec.

—— What we know about Boston ferns: What Boston fern is best? Weekly articles in the *Florists' Exchange*. Oct. 28–Dec. 30, with the exception of Dec. 23. The various titles are as follows:

I. What is the best Boston fern?—Some general considerations and the grower's viewpoint. Oct. 28.

II. Retailer's viewpoint. Oct. 28.

III. The standpoint of the home. Nov. 4.

IV. Experimental evidence and its value. Nov. 11.

V. How to distinguish the different varieties. Nov. 18.

VI. Classifying Bostons according to size. Nov. 25.

VII. Distinguishing varieties. Dec. 2.

VIII. Retailers' opinions: "Best Boston fern." Dec. 9.

IX. Can the fern plant trade be standardized.? Dec. 16.

Henry Barrows, fern specialist. Dec. 30.

Caparn, Harold A.

—— The palisades interstate park. *Parks and Recreation* **5**: 355–356. Mch.–Apr.

—— Central Park Memorial. *New York Times.* July 3.

—— Tree planting difficulties facing project of renewing Central Park mall. *New York Times.* July 5.
—— "Ze Ceety Pays." *Nat. Munic. Rev.* Dec., 1922.

Free, Montague

—— Things and thoughts of the garden. Monthly articles in *Gardeners' Chronicle of America.* January to June, inclusive.

Gager, C. Stuart

—— Eleventh annual report of the Brooklyn Botanic Garden, 1921. *Brooklyn Bot. Gard. Rec.* **11**: 25–46. April.
—— The first "botanic" garden in Brooklyn. *Brooklyn Bot. Gard. Rec.* **11**: 115–118. Oct.
—— Historical note concerning the Brooklyn Hunt Botanical Garden. *Brooklyn Bot. Gard. Rec.* **11**: 118–121. Oct.
—— Financial support of technical journals. *Science* **56**: 633. 1 Dec.

Graves, Arthur Harmount

—— Arbor Day. *Brooklyn Bot. Gard. Leaflets* **X**[1]. April 5.
—— 229 newspaper articles relating to the Brooklyn Botanic Garden.

Gundersen, Alfred

—— The Evolution Group at the Brooklyn Botanic Garden. *Brooklyn Bot. Gard. Leaflets* **X**[6]. June 14.

Shaw, Ellen Eddy

—— Educational work at the Brooklyn Botanic Garden. *Museum Work* IV: 2, 68–72. Sept.–Oct., 1921. (Published in March, 1922.)
—— School gardening in 1922. *Nature Study Review* **18**: 3, 69–74. March.
—— Gardening and the city child. *Natural History* XXII: 2, 141–151. March–April.
—— Report of the Curator of Elementary Instruction for 1921. *Brooklyn Bot. Gard. Record* **11**: 58–65. April.
—— Little gardens for little boys and girls. *The Free Kindergarten* III: 7, 4. May.

Simpson, Ray

—— Report of the Librarian for 1921. BROOKLYN BOT. GARD. RECORD **11**: 65–72. April.

Taylor, N.

—— Wm. Patten's "The Grand Strategy of Evolution." Literary Review, *New York Evening Post.* 18 March.

—— John Percival's "The Wheat Plant." Literary Review, *New York Evening Post.* 22 April.

—— Report of the Curator of Plants and Plantations for 1921. *Brooklyn Bot. Gard. Rec.* 9: 46–51. April.

—— R. H. Gabriel's "Evolution of Long Island" (Review). *Ecology* 3: 261, 262. July.

—— The Forests and Some Big Trees of Long Island. *Brooklyn Bot. Gard. Leaflets* **X**[8]. 4 October.

—— Botany, the Science of Plant Life. Vol. 13, in the *Popular Science Library.* 384 pages. P. F. Collier & Co. December.

White, Orland E.

—— Where monkey steak is relished. Editorial page, *New York Evening Sun.* April 29.

—— Brazil Nuts. *Brooklyn Bot. Gard. Leaflets* **X**[4]. May 17.

—— Botanical exploration in Bolivia. *Brooklyn Bot. Gard. Record* **11**: 93–105. July. (Reprinted in part on editorial page of the *New York Evening Sun* and the *New York Evening Post.*)

—— Die Castorbohne oder Rizinus (Ricinus communis L.) Chapter in *Handbuch der landw. Pflanzenzuchtung,* vol. 5 (edited by C. Fruwirth). Paul Parey, Berlin.

APPENDIX 3

PUBLIC LECTURES, ADDRESSES, AND PAPERS GIVEN BY MEMBERS OF STAFF DURING 1922

By the Director of the Garden:

Jan. 23. *What the Brooklyn Botanic Garden means to Brooklyn and to Greater New York.* Republican Club, 18th Assembly District, Church Ave., Brooklyn.

April 8. *The contributions of the Brooklyn Botanic Garden to the Conservation Movement.* (Final Conservation Week Program.) N. Y. City Federation of Women's Clubs, Borough Hall, Brooklyn.

April 18. *Mr. Bryan and evolution.* Methodist Episcopal Church, Baldwin, L. I.

April 21. Arbor Day address. Public School 139, Brooklyn.

April 28. The civic value of botanic gardens. Public lecture, Brooklyn Botanic Garden, April 28.

Dec. 28. Induction of gene and chromosome mutations in *Datura* by exposure to radium rays. (Dr. A. F. Blakeslee, co-author of the paper.) Bot. Soc. Am. Boston meeting.

By the Curator of Plants:

April 6. Wild flowers of New Jersey and their cultivation. Englewood Garden Club.

April 7. Cultivation of woodland plants. Brooklyn Botanic Garden.

April 14. Protecting American wild flowers. Loomis Institute, Windsor, Conn.

April 30. Beautiful gardens. International Garden Club, New York.

May 8. Preservation of New England wild plants. Massachusetts Horticultural Society, Boston.

May 12. Preservation of New England wild plants. Boy Scouts of America, Boston.

May 13. New England wild flowers. Girl Scout Leaders of Boston district, Lincoln, Mass.

May 14. New England wild flowers and their protection. Simmons College, Boston.

May 15. Preservation of New England wild flowers. Girls' City Club, Boston.

May 31. Climatic and soil features of Long Island vegetation. Torrey Botanical Club.

Sept. 2. The passing of our native flora. New York Botanical Garden.

By the Curator of Public Instruction:

April 12. The chemical aspects of plant life. New Lots Evening High School, Brooklyn.

April 29. Wild flowers of the eastern United States. Green Mountain Club, New York.

May 5. Arbor Day and conservation. Curtis High School, Staten Island.

Oct. 5. The development of the Brooklyn Botanic Garden. Central Branch, Y. M. C. A., New York City.

Oct. 28. Health and disease in plants. Brooklyn Botanic Garden.

Oct. 31. The importance of plants. Natural Science Club, Boys' High School, Brooklyn.

Nov. 27. The life of the plant. Science Club, Hunter College, New York.

Dec. 19. The nature of protoplasm. Heyward Annex, Boys' High School, Brooklyn.

Dec. 28. The Melanconis disease of the butternut. American Phytopathological Society Annual Meeting, Boston.

By the Curator of Elementary Instruction:

Jan. 19. Backyard gardens. Mothers' Club, P. S. 110.

Feb. 7. Home gardening with children. Pleasantville Garden Club.

Feb. 16. Plant life. P. S. 108.

Feb. 20. Opportunities offered by the Brooklyn Botanic Garden to Girl Scouts. Tompkins Avenue Congregational Church.

Feb. 21. Plant products found in our stores. P. S. 108.

Feb. 24. Home gardens for little children. P. S. 108.

Feb. 28. What plants teach us about our own children. Wells' Memorial Presbyterian Church.

March 6. Nature study for defective children. P. S. 27, Manhattan.

March 9. What the Brooklyn Botanic Garden offers to children. P. S. 50.

March 10. The small flower garden. Mothers' Club, P. S. 56, Queens.

March 16. Plants and their care. Mothers' Club, Model School.

March 17. Flowers and their meaning. Mothers' Club, P. S 43, Manhattan.

March 20. The value of nature study in the school curriculum. West Orange School.

March 23. What the Brooklyn Botanic Garden does for school children. Mothers' Club, P. S. 42.

March 30. The plant world. Mothers' Club, P. S. 113.

March 31. The plant world. Mothers' Club, P. S. 97, Queens

April 4. The out-of-door world. Mothers' Club, P. S. 47.

April 18. The work the Brooklyn Botanic Garden does for children. Mothers' Club, P. S. 36, Queens, at the Brooklyn Botanic Garden.

April 27. Gardens for little children. Mothers' Club, P. S. 144.

April 28. Spring wild flowers. P. S. 116. Two assemblies.

May 3. What the Brooklyn Botanic Garden offers to children Mothers' Club, P. S. 124, at the Brooklyn Botanic Garden.

May 10. Nature study for little children. Bristol Kindergarten Club.

May 20. What the Brooklyn Botanic Garden offers to children. Mothers' Club, P. S. 97, Queens, at the Brooklyn Botanic Garden.

May 21. Children's gardens. New York Botanical Garden.

May 24. What the Brooklyn Botanic Garden does for boys and girls. Mothers' Club, P. S. 106, at the Brooklyn Botanic Garden.

June 1. Nature study for little children. Mothers' Club, P. S. 185.

June 2. Forestry. P. S. 128.

Oct. 10. What the Brooklyn Botanic Garden offers to Brooklyn children. P. S. 69.

Oct. 19. The work the Brooklyn Botanic Garden does for boys and girls. Mothers' Club, P. S. 42, at the Brooklyn Botanic Garden.

Oct. 20. Indoor planting of bulbs. Mothers' Club, P. S. 20.

Oct. 26. The children's garden exhibit at the Brooklyn Botanic Garden. P. S. 70.

Oct. 31. Fall fruits. P. S. 41.
Dec. 20. Christmas customs. P. S. 41.
Dec. 21. Christmas greens and their meaning. P. S. 69.
Dec. 22. The significance and meaning of the use of holly and mistletoe in Christmas festivities. P. S. 36.

By Assistants in the Department of Elementary Instruction:

Sept. 19. Our national forests. Mothers' Club, P. S. 36, Queens, Miss Hickok, Instructor.
Oct. 24. The activities of the Department of Elementary Instruction of the Brooklyn Botanic Garden. Wells' Memorial Presbyterian Church, Miss Sanders, Instructor.
Oct. 30. Our city trees. Manual Training High School Annex, Miss Hammond, Assistant Curator of Elementary Instruction.
Nov. 16. The activities of the Department of Elementary Instruction of the Brooklyn Botanic Garden. Mothers' Club, P. S. 163, Miss Hammond, Assistant Curator of Elementary Instruction.

By the Curator of Plant Breeding:

Oct. 10. The economic plants of the Bolivian Indians. The Department of Botany, Brooklyn Institute of Arts and Sciences. Brooklyn Botanic Garden.
Oct. 14. The origin of cultivated plants. Brooklyn Bot. Garden.

By the Associate Curator of Plants:

Dec. 29. The Relationships of Some Orders of Dicotyledons. Before the Systematic Section, Botanical Society of America, in Boston.

By the Horticulturist and Head Gardener:

Jan. 11. Rock and Alpine Gardens. Woman's Auxiliary of the Botanic Garden, Brooklyn Botanic Garden.
Apr. 25. The Brooklyn Botanic Garden. Arlington Men's Club, Cypress Hills, N. Y.
May 10. Rock Gardens. Staten Island Horticultural Society, Institute of Arts and Sciences, New Brighton, S. I.

May 16. Rock and Alpine Gardens. Garden Clubs of the Oranges and Englewood, Brooklyn Botanic Garden.

May 25. Rock and Alpine Gardens. Orange and Duchess County Garden Clubs, and Botany Department of Vassar College, Poughkeepsie, N. Y.

July 13. Rock Gardens. Washington Garden Club, Washington, Conn.

Oct. 7. A Garden Pilgrimage in England. Brooklyn Botanic Garden.

Oct. 31. A Garden Pilgrimage in England. Morristown Garden Club, Morristown, N. J.

By the Librarian:

April 13. Problems in a Botanical Library. Senior class, Library School, of the New York Public Library.

Oct. 6. Methods used in the organization and work of the library of the Brooklyn Botanic Garden. Junior class, Library School, New York Public Library, annual visit at Brooklyn Botanic Garden.

Nov. 10. The Work of the Brooklyn Botanic Garden Library. Brooklyn Botanic Garden.

By the Registrar and Custodian:

	Attendance
Jan. 17. Trees and their woods. Inkowa Club of New York City. American Museum of Natural History, New York City	17
Feb. 11. Father and son dinner. Troop 24, Boy Scouts of America	65
Feb. 25. Nature. Patrol Leaders' training course, Nassau Co. Council, Boy Scouts of America. Freeport, L. I., Episcopal Church, Longbeach Ave. and Pine St	118
March 11. How to exhibit nature material. Museum Scout Group. Public Library, Plainfield, N. J.	22
April 4. Nature in Scout program. Scout Masters' School of Brooklyn Institute, Academy of Music Building	90

May 1. Emulating nature in gardens. Scout Masters' Club of Brooklyn, Boy Scout headquarters, 201 Montague St., Brooklyn	56
June 26. Troop 36, Boy Scouts, P. S. 66, Sutter Ave. and Osborn St., Brooklyn	40
July 13.–Aug. 10. About 100 talks. Kanohwahke Lakes Boy Scout camps, Palisades Park, N. Y.	3,500
Aug. 12. Troop 68, Boy Scouts, in camp at Oakland, N. J.	20
Aug. 19–20. N. J. State Y. M. C. A., Andover, N. J. (3 talks x 165)	495
Sept. 25. Perennials. Staten Island Garden Club, Dongan Hills	30
Nov. 12. Life story of the honey bee. Inkowa Club of New York City	31
	4,484

APPENDIX 4

REPORT ON BROOKLYN BOTANIC GARDEN PUBLICATIONS, 1922

American Journal of Botany.—The ten issues for 1922, monthly except August and September, comprise Volume IX, with 45 articles, 581 pages, 35 plates, and 14 text figures. This journal, which is the official organ of the Botanical Society of America, had a circulation as of December 31, 1922, of 1,250, including nearly every civilized country. The Editor-in-Chief is Prof. C. E. Allen, University of Wisconsin, with the cooperation of an editorial board of seven.

Ecology.—Official publication of the Ecological Society of America. Quarterly. The four issues of Volume III (1922) contain 31 contributions, besides Reviews, Proceedings of the meetings of the Ecological Society of America at Toronto, December 28 and 29, 1921, Zoological Abstracts, and Notes and Comment, comprising a total of 351 pages with 63 text figures. The circulation as of December 31, 1922, was 847. The Editor-in-

Chief is Major Barrington Moore, with an editorial board of fourteen.

Genetics.—Bi-monthly. This journal is not the official organ of any society, but is published by the Botanic Garden in cooperation with the Editorial Board of ten editors, of which Prof. George H. Shull, of Princeton University, is editor-in-chief. Although *Genetics* is in its seventh volume, it was not published by the Brooklyn Botanic Garden until the beginning of that volume (January, 1922). On account of delays incidental to the change of publisher, only four of the six issues of volume 7 appeared during 1922, containing 9 articles with a total of 426 pages, 171 text figures, and one plate.

Record.—With its issue for October, 1922, our administrative quarterly, the *Brooklyn Botanic Garden Record,* completed its eleventh volume, comprising 130 pages with 11 half-tone illustrations. As usual, the January number contained the Botanic Garden *Prospectus* of courses, lectures, and other educational advantages offered during the year. The April number comprised the *Eleventh Annual Report* of the Garden.

Contributions.—Two numbers, Nos. 27 and 28, have appeared. Other numbers were in press or in preparation at the close of the year.

Seed List.—The annual *List of Seeds,* published in December, listed seeds of about 940 species and varieties offered in exchange with other botanic gardens. With this issue there was included a communication addressed to other botanic gardens, raising the question as to the desirability of uniformity in the arrangement of plant families in all seed lists. There are at present in use at least four different arrangements.

Miscellaneous.—The Garden issued as a reprint from the *Fern Journal* for September, 1922, an article on "Game laws for ferns and wild flowers," by Dr. R. C. Benedict, resident investigator. Numerous miscellaneous announcements of courses and lectures were also printed and distributed.

APPENDIX 5

MEETINGS OF ORGANIZATIONS AND SOCIETIES AT THE GARDEN, 1922

	Attendance
January 11. Woman's Auxiliary of Brooklyn Botanic Garden	32
April 5. New York Club of U. S. Department of Agriculture	148
April 15. Torrey Botanical Club	9
April 18. Mothers' Club, P. S. No. 36, St. Albans, Queens	10
April 22. Vandeveer Park Mothers' Association	49
May 16. Garden Club of the Oranges	22
May 17. Daughters of the American Revolution	28
May 20. Mothers' Club, P. S. 97	40
May 20. Mothers' Club, P. S. 61	10
May 21. Inkowa Club of New York City	17
May 24. Mothers' Club, P. S. No. 106	300
May 25. Mrs. Clinton Rossiter's Mothers' Club of Brooklyn Y. W. C. A	25
May 27. New York Society of Craftsmen	25
June 3. Betsy Ross Chapter of the Daughters of the Revolution	14
October 3. City Gardens Club	15
October 6. New York Library School	34
October 10. Department of Botany of Brooklyn Institute of Arts and Sciences	49
Total attendance	827

APPENDIX 6

FIELD TRIPS

By the Registrar and Custodian:

May 20. Department of Botany, Brooklyn Institute. Flushing, L. I.

May 21. Inkowa Club of New York City. Brooklyn Botanic Garden.

May 24. Bergen County Kindergarten-Primary Association. Coytesville, N. J.

October 1. Abraham & Straus salespeople. Van Cortlandt Park.

October 2. Good Citizenship League of Flushing, L. I. Prospect Park.

October 15. Abraham & Straus employees' organization. Palisades.

October 21. Department of Botany, Brooklyn Institute. Llewellyn Park, Orange, N. J.

By the Associate Curator of Plants:

June 3. Brooklyn Institute, Dept. of Botany, Queens, L. I.

Oct. 1. Torrey Botanical Club, Bellaire, L. I.

APPENDIX 7

REPORT ON PHOTOGRAPHIC WORK, 1922

Negatives on file December 31, 1921		3,819
Negatives accessioned during 1922		566
		4,385
Broken or lost		4
Total negatives on file Dec. 31, 1922		4,381
Lantern slides on file December 31, 1921		2,998
Lantern slides accessioned during 1922		409
Total lantern slides on file Dec. 31, 1922		3,407
Prints on file December 31, 1921 *		0
Prints made during 1922	1512	
Used or distributed	801	
Filed		711
Total prints on file Dec. 31, 1922		711
Enlargements made		692

* The filing of photographic prints was begun January 1, 1922.

APPENDIX 8

OFFICERS OF THE WOMAN'S AUXILIARY

Miss Hilda Loines, President.
Mrs. Frank J. W. Diller, Secretary and Treasurer.

Chairmen of Committees

Mrs. Lewis W. Francis, Membership.
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Mrs. Glentworth R. Butler, Elementary Education.
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GENERAL INFORMATION

MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dark. On Sundays and Holidays at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 978 Washington Avenue, opposite Montgomery Street.

A DOCENT will conduct parties through the plantations and conservatories. For schedule of regular trips consult the annual *Prospectus*. No trips will be taken with parties of less than ten adults. Children must be accompanied by an adult. *Members of the Botanic Garden* may make special advance arrangements for themselves and friends with the Curator of Public Instruction for trips at other times.

TO REACH THE GARDEN take Broadway (B.R.T.) Subway to Prospect Park station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the directors and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly. Volume I, *Dedication Papers:* comprising scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. Price $3.50, plus postage.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

18. *Inheritance of endosperm color in maize.* 11 pages. 1917.

19. *Studies in inheritance in Pisum. II. The present state of knowledge of heredity and variation in peas.* 102 pages. 1917.

20. *Inheritance studies in Pisum. III. The inheritance of height in peas.* 7 pages, fig. 1. 1918.

21. *A sketch of plant classification from Theophrastus to the present.* 16 pages. 1918.

22. *A basis for reconstructing botanical education.* 6 pages. 1919.

23. *Plant families: a plea for an international sequence.* 9 pages. 1920.

24. *Plants and animals of Mount Marcy, New York.* 69 pages, 1 plate, 22 figs. 1920.

25. *Endemism in the Bahama flora.* 10 pages, fig. 1, 1921.

26. *Plant composition and soil acidity of a Maine bog.* 4 pages, 1921.

27. *The origin of new varieties of Nephrolepis by orthogenetic saltation. II. Regressive variation or reversion from the primary and secondary sports of Bostoniensis.* 18 pages, 6 plates. 1922.

28. *Botanical exploration in Bolivia.* 13 pages. 1922.

29. *Anthracnose of the Boston fern.* 7 pages, 2 plates. 1923.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $6.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year.

BROOKLYN BOTANIC GARDEN RECORD

Vol. XII JULY, 1923 No. 3

EDITED BY
C. STUART GAGER

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BOTANIC GARDEN STAFF

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FIG. 12.—The Alfred T. White Memorial. The bronze tablet was unveiled June 7, 1923.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. XII July, 1923 No. 3

UNVEILING OF THE ALFRED T. WHITE MEMORIAL

On Thursday afternoon, June 7, 1923, at 4 o'clok exercises were held on the occasion of the unveiling of the Memorial to the late Alfred T. White, "father" and benefactor of the Brooklyn Botanic Garden, and for eleven years chairman of the Botanic Garden Governing Committee. The memorial consists of a semi-circular stone seat facing a tablet of serpentine rock, which bears a bronze plaque 6 ft. high by 5½ ft. wide; designed by Mr. Daniel Chester French. At the right of the design is the figure of a woman, seated, with a small child beside her. In her lap is a partly completed wreath of mountain laurel, and she is reaching forward to pluck a branch from a laurel bush in blossom on the opposite side of the plaque beneath an oak. The space between the tablet and the seat is paved with irregular slabs of slate, and the area immediately back of the seat is thickly planted with pines. The seat and tablet were designed by Mr. Henry Bacon, who was the architect of the Lincoln Monument in Washington. The statute of Lincoln in this monument was by Mr. French.

The memorial was a gift from former friends and associates of Mr. White. The Memorial Committee was composed of Mr. Frederic B. Pratt, Chairman, Mr. Frank L. Babbott, Mr. William Hamlin Childs, Mr. Walter H. Crittenden, Mr. Robert W. De-Forest, Mr. Darwin R. James, Mr. James H. Post, Mr. William

A. Putman, and Mr. Howard O. Wood. Mr. Edwin P. Maynard was treasurer of the fund. The following was the

PROGRAM

Presiding

MR. FREDERIC B. PRATT

Presentation Address

MR. R. FULTON CUTTING

Unveiling of the Memorial

Acceptance on behalf of the City

HON. JOHN N. HARMON
Commissioner of Parks, Brooklyn

Acceptance on behalf of the Botanic Garden

MR. FRANK BAILEY
Chairman Botanic Garden Governing Committee

The plaque was covered with a double curtain of smilax, with a large wreath of bronzed magnolia leaves, cycad leaves, and red carnations lying at the base. The unveiling was by the two grandchildren of Mr. White, Miss Katharine Van Sinderen and her brother Master Adrian Van Sinderen, Jr., who pulled the cords that drew the smilax curtain to either side, thus disclosing the bas-relief to view. The fifteen fine specimens of dwarf pines planted at the back of the Memorial were presented by Mr. Frank Bailey, Mr. White's successor as chairman of the Botanic Garden Governing Committee.

BOTANICAL SOCIETIES TAKE ACTION TO SAVE NATIVE PLANTS

On Wednesday, May 23, the Torrey Bontanical Club, the New York Bird and Tree Club, the American Fern Society, and the Wild Flower Preservation Society of America held a joint meeting at the Brooklyn Botanic Garden. The party was conducted about the grounds by Mr. Norman Taylor, inspecting the Japanese Garden, the Rock Garden, the systematic collection and the Chil-

dren's Gardens, with side studies of birds with Dr. George M. Reed, and of trees with Dr. Arthur Harmount Graves. After a box luncheon in the Laboratory Building, a formal session was held, with Dr. C. Stuart Gager, director of the Botanic Garden, presiding. Dr. Arthur Harmount Graves, also of the Botanic Garden, acted as secretary. Dr. R. C. Benedict, Resident Investigator at the Garden, addressed the combined societies on "Game Laws for Ferns and Wild Flowers." Representatives of the White Plains Bird and Tree Club, the Garden Club of Elizabeth, the Tree Club of Flushing, and the Washington, D. C., Pennsylvania, and Illinois chapters of the Wild Flower Preservation Society of America attended.

Important action was taken in the election of a committee consisting of one representative each of the four societies first named, *i.e.*, the Torrey Botanical Club, the New York Bird and Tree Club, the American Fern Society, the Wild Flower Preservation Society, to draft a bill for New York State, looking toward the conservation of our native flowers and ferns. The following delegates were elected to this committee: Dr. R. C. Benedict, of the Brooklyn Botanic Garden, from the American Fern Society, Dr. Clyde G. Fisher, of the American Museum of Natural History, from the New York Bird and Tree Club, Dr. Homer D. House, of the New York State Museum, from the Wild Flower Preservation Society of America, and Dr. M. A. Howe, of the New York Botanical Garden, from the Torrey Botanical Club: also Attorney Augustus O. Bourn, Jr., a member of several interested societies, was invited to serve on this committee to assist as legal advisor in formulating the bill. The proposed new law is to provide for the conservation of all native American plants.

This timely action will be greatly welcomed by all thoughtful citizens and flower lovers who have viewed with apprehension the reckless uprooting and removal of our native plants from woods and fields by automobile parties and others—a thoughtless custom which is resulting in the rapid disappearance of some of our most beautiful native American wild flowers.

THE NEED OF PUBLIC DRINKING FOUNTAINS

The following letter, under date of June 13, 1923, is only one of many requests and inquiries received concerning the possibility of installing bubbler drinking fountains in the Botanic Garden grounds. With our growing attendance (over 65,000 in May, 1923) there is an increasingly large number of children who particularly feel the lack of adequate opportunity to get a drink of water. The letter, addressed to the director, reads as follows:

"I am writing this in favor of a number of small people who visit your beautiful gardens every day and who would very much like to know whether there could possibly be a drinking fountain placed somewhere on the lawns so as to enable them to quench their thirst these hot summer days.

"I myself am the teacher of a small kindergarten group and find the present possibilities of obtaining drinking water rather difficult.

"I am quite sure that also a number of mothers who take their little ones to the gardens in the afternoon would greatly appreciate the comfort of a sanitary drinking fountain.

"Hoping that it may be possible for you to arrange for this, I am

Very sincerely yours."

Our reply contained the following statement: "We have, on a number of occasions, urged in our Annual Reports the need of more drinking fountains. At present the only probability of our being able to secure funds for this purpose in the near future is for some public-spirited individual or some organization to make a contribution for this purpose."

NOTES

Inscription in the Library.—During the first week in May the following Latin quotation from Linnaeus (*Philosophia Botanica,* Stockholm, 1751) was placed on the narrow oblong panels at the edge of the balcony floor in the reading room of the library:

"Verus botanicus ubique scientiam Botanices excolit;
Oculis propiis, quae singularia sunt, observat;
Nec sua solum ex Auctoribus compilat."

The English translation is as follows:

"The true botanist cultivates everywhere the science of botany;
With his own eyes he observes those things that are noteworthy;
But not with his own eyes alone; he also utilizes material from investigators."

The letters are laid in gold leaf with red edge, and the quotation adds much to the good appearance of the room. The Botanic Garden is greatly indebted for the design to Messrs. McKim, Mead, and White, who were the architects of the building. The work was done by Mr. James William Bolton, of Brooklyn.

Pasteur-Mendel Program.—On April 19 exercises were held at the Botanic Garden in commemoration of the one hundredth anniversary of the births of Louis Pasteur and Gregor Mendel. Dr. George M. Reed gave the paper on Pasteur and Dr. Orland E. White the paper on Mendel. There was placed on exhibition in the rotunda of the Laboratory Building enlarged portraits of both Pasteur and Mendel, illustrations of places and incidents associated with the lives of both men, fac-similes of some of the apparatus used by Pasteur in his classic experiments on biogenesis, and living and preserved plant material illustrating the experiments of Mendel with the garden pea which laid the foundation for the modern science of genetics.

A brood of seven young wild black ducklings have been an object of considerable public interest in the Botanic Garden lake during June. The parent birds make their temporary home in this lake each spring and fall, and the brood was hatched here, but at just what spot on the lake or the brook flowing from it no one is able to say—probably on Rock Island.

Registration in Courses.—The Registration in the spring courses for adults has been as follows: Evolution and classification of plants (Dr. Graves and Dr. Gundersen), 14; Greenhouse work for teachers (Miss Shaw and Miss Sanders), 45; The flower garden (Mr. Free), 36; Trees and shrubs of Brooklyn and vicinity (Dr. Graves), 50, of whom 22 were men; Spring flowers and ferns (Dr. Gundersen) 8. Mr. Free's course on the flower

garden was obliged to meet in two sections on account of limitations of space in the greenhouse where the instruction was given. The registration in the special course in Nature Art, under the direction of Miss P. F. Pond, chairman of the art department of the Girls' High School, was 21. The posters made by this class, showing the utilization of plants and plant parts in design were exhibited at the annual Spring Inspection on May 8.

Library gifts.—Among gifts recently received for the Botanic Garden library is a copy of *Dans L'Atlantique,* by M. Henri Deherain, Conservateur de la Bibliotheque de l'Institut, Paris, France, presented by the author. The book is in four parts, all of which have to do with events which took place in the Atlantic Ocean and its islands and coasts. The fourth part treats of the voyages of August Broussonet to Morocco and the Canary Islands. Broussonet was a French botanist who was born at Montpellier Feb. 28, 1761 and died at the same place on Jan. 17, 1807. He was educated in medicine, and on a visit to England he was made an honorary member of the Royal Society. Under the convention he was obliged to leave Paris, but finally obtained permission from the Directory to return to France, and in 1805 he was appointed professor of botany at Montpellier.

A gift was also received in April from Mr. Frank Bailey of the four large volumes of the *Philosophy of Botany,* by Robert J. Thornton, published in London in 1810.

Visitors to the Botanic Garden since the beginning of the year include the following: Dr. R. P. Lohnes and Dr. William Browning, Brooklyn; Mr. Eduardo Quisumbing, University of the Philippines (Manilla; Dr. S. L. Kwong, Agr. Exp. Station, Canton, China; Mr. J. Franklin Collins, Providence, R. I.; Mr. A. B. Seymour, Harvard University; Dr. Frederick S. Lee, New York City; Mr. N. Fujita, Medical Corps, Japanese Army, Tokio; Mr. A. V. Frič, Prague; Mr. Alfred Rehder; and Prof. Teizo Niwa, Professor of Horticulture, Mie Imperial College of Agriculture, and Expert of the Imperial Garden, Shinjuku, Tokyo, Japan. Mr. Niwa is a specialist in the breeding of chrysanthemums.

The Elias J. Durand Herbarium and Library has been purchased by Cornell University for its Department of Plant Pathology. The library will be incorporated in the University Library. Professor Durand received the degree of doctor of science at Cornell University in 1895 and was a member of the staff of the Department of Botany of the University and of the Cornell Agricultural Experiment Station from 1895 to 1910; from 1910 to 1912 he was assistant professor of botany, and from 1912 to 1918 associate professor at the University of Missouri. He was professor of botany at the University of Minnesota from 1918 until his death on Oct. 29, 1922. He was especially interested in the structure and taxonomy of the discomycetous fungi.

A Botanic Garden in Cincinnati?—The question of the establishment of a botanic garden in Cincinnati is being agitated. *The School Index,* the official publication of the Cincinnati Public School System, contains on page 150 of the issue for January 19, 1923, a note concerning this movement, containing a quotation from the *Tenth Annual Report* of the Brooklyn Botanic Garden concerning the value of botanic gardens to the communities in which they are located, and in a larger way to the educational and scientific world.

Tree Planting Encouraged.—The American Tree Association, Washington, D. C., is offering free membership in the Association to "every man, woman, or child in the United States who plants a tree during 1922–1923." As the president of the Association, Mr. Charles Lathrop Pack, states it, they are "calling upon the people to celebrate the centennial of Arbor Day in 1972, fifty years before it happens, by planting trees now." The application blanks contains the following quotation from Theodore Roosevelt: "A people without children would face a hopeless future; a country without trees is almost as helpless; forests which are so used that they cannot renew themselves will soon vanish, and with them all their benefits. When you help to preserve our forests or plant new ones you are acting the part of good citizens."

Newspaper Biology.—We learn from *School Life* for April, 1923, that Prof. Otis W. Caldwell, Director of the Lincoln School, Teachers College, Columbia University, has recently examined seventeen full months issues of representative daily newspapers for the purpose of ascertaining the amount of popular material on biological subjects and its reliability. There were examined in all a total of 492 different papers comprising approximately 14,000 pages. All the biological articles found on these pages, exclusive of paid advertisements, and regularly recurring commercial stock reports, were collected and classified. Mere biological allusions were omitted, thus limiting the collection to articles clearly biological and of news or editorial value. A total of 3,061 articles were thus secured, having an average column length per article of over 8 inches. A study of this material shows that the biological topics given greatest prominence were health, animals, plants, and food. It was found that the average length of articles on general nature and evolution is slightly greater than that of the four groups just mentioned, but the total number of such articles is relatively quite small. Fictitious, or make-believe, or spurious biology is surprisingly small, since but 14 of the 3,061 articles were of that nature. Of the 492 issues of newspapers studied no issue was without one or more biological articles, and these articles were found of substantially the same general type in all parts of the country, with local variations accounted for by special local conditions. The proportion of biological material to the number of pages issued monthly by different papers does not vary greatly. This is taken by Dr. Caldwell to indicate a fairly well recognized need and use of newspaper copy from this field.

The eighteenth annual convention of the American Association of Museums was held at Charleston, S. C., April 3-9, as guests of the Charleston Museum. This is the oldest museum in the United States, having been founded in 1773, only twenty years after the founding of the British Museum. The program included exercises in celebration of the one hundred and fiftieth anniversary of the museum. The Brooklyn Botanic Garden was represented by Dr. C. Stuart Gager.

Federated Garden Clubs of Long Island.—Delegates from eleven of the twelve garden clubs and garden committees of women's clubs on Long Island met at the Brooklyn Botanic Garden on Friday afternoon, April 27, under the temporary chairmanship of Mrs. John W. Paris, President of the Flushing Garden Club, Inc. Mrs. Richard A. Foster, chairman of the Park-Garden Committee of the Jackson Heights-Elmhurst Women's Club, was made secretary of the meeting. The object of the meeting was the formation of a Federation of the Garden Clubs of Long Island. After brief introductory remarks and welcome by the director of the Botanic Garden, reports were received from the delegates, and the Federation was formally organized by the adoption of plan of federation and the election of the following officers for one year: President, Mrs. John W. Paris; Secretary, Miss Hilda Loines, Chairman of the Woman's Auxiliary of the Brooklyn Botanic Garden. Members of the Auxiliary acted as hostesses and after the meeting adjourned the delegates attended the last of the public spring lectures of the Botanic Garden, on "What's new in the garden," by Mr. Edward I. Farrington, editor of *Horticulture,* Boston, Mass. The Spring (1923) number of *The Garden Bulletin,* of the Flushing Garden Club contains an article by Dr. Gager on "A Long Island Federation of Garden Clubs," in which there are noted some of the advantages of such a federation.

Arbor Day.—On the afternoon of April 27 the auditorium was nearly filled with an audience of about 550 public school pupils for a program, including motion pictures, in recognition of Arbor Day.

The Evolution Film.—On the afternoons of Friday, April 6, and Sunday, April 8, 1923, occurred the first showing in Brooklyn of the new motion picture film, "Evolution, from the Birth of Planets to the Age of Man." This film, produced by Dr. Raymond L. Ditmars, and edited by Dr. Benjamin C. Gruenberg, aims to depict the method of formation of planetary bodies, and the development of plant and animal life on the earth. The film was shown at 2.30 o'clock on Friday to a capacity audience (about

570) of pupils from public and private high schools, and at 4 o'clock on the same day to an audience of adults that also filled the hall. On Sunday afternoon there were present about 750, standing room being at a premium, and at least fifty persons being turned away.

International Conference of Phytopathology.—The Brooklyn Botanic Garden has received an invitation and provisional program for the international conference of phytopathology and economic entomology, held in Wageningen, Holland in June, 1923. Arrangements for the Conference were carried out by a committee, of which Prof. Dr. H. M. Quanjer, Acting Director of the Phytopathological Institute and Potato Research Laboratory of the High School of Agriculture, Wageningen, is president, and Mr. T. A. C. Schoevers, Phytopathologist, Wageningen, Under-director of the Phytopathological Service, is secretary. Phytopathologists and economic entomologists of all countries were urgently invited to attend in order to make the Conference as profitable as may be, and to bring about a mutual understanding. The Conference was held from June 25-30. The official language at the Conference was English, but papers were accepted to be read or discussed in either English, French, or German. The provisional program states that "an announcement already sent out by the Dutch Government to the Governments of foreign countries may tend to facilitate the defraying of expenses of those wishing to attend. The first international conference on potato diseases was held in June, 1919, when specialists in plant diseases from foreign countries united with phytopathologists of the United States. The meetings for the consideration of potato diseases were held at Riverhead, L. I., on June 24-25, and the members of the conference held an all-day session at the Brooklyn Botanic Garden on June 28 in conjunction with the Northeastern Association of Plant Pathologists.

The Conservation of Natural Areas.—Wicken Fen, an area of over 500 acres in England, is being held for the nation by the "National Trust for Places of Historic Interest or Natural Beauty." This area comprises Fen Land which has never been

cultivated or drained in any way. A series of articles is being issued, dealing with the natural history of the various groups of animals and plants which the Fen contains, the series when completed to form a volume. The publishers' announcement of this publication contains the following statement:

There has been no destruction of its natural vegetation and fauna, and there has been no introduction of new plants and animals. While much of it is dry and produces crops of reed, sedges and rough herbage, all of it is subject to winter floods. Indeed the greater part of it is in almost the same condition as it must have been before any drainage of the Fens took place. There has been no break of continuity, its present stock of animals and plants being the direct descendant of the original stock.

Wicken Fen is now the only large area of Fen Land in its natural condition, and on acccount of this its flora and fauna and their relationship to one another and to fen conditions are of peculiar interest. It is now proposed to publish a series of parts the whole forming a single volume, in which shall be recorded its present condition, leaving to subsequent generations to ascertain the changes which take place under natural conditions.

The conservation of such areas by Government cannot be too highly commended, and the case of the Wicken Fens suggests the rare opportunity which still exists for conserving in its natural condition a portion of the Hempstead Plains on Long Island. As is well known to scientists, this area constitutes the only case of a natural prairie in North America, with the exception of the great prairie region of the West. The Plain is rapidly being encroached upon by building operations and other activities of civilization, but there are still many acres affording an area sufficiently large to continue to maintain itself in a state of nature, provided the movement toward this end is not too long delayed.

Forest Conservation in Africa.—The disappearance of protective forests in the Uganda Protectorate and the need of forest preservation is set forth in the "Annual Report on the Forestry Department for the year 1921," pages 14-15, as follows:

The fact that so small a percentage of the Protectorate is under forest makes it most important that the forests should be carefully protected, their resources conserved and utilised to the very best advantage, and attention to sylvicultural requirements with the object of improving them, and the advisability of extending the area under forest are of the greatest importance to ensure permanent and increased supplies, and it is essential

that every effort be made to gradually convert a fair percentage of the forest land from its present condition into normal and more productive forest.

Apart from the immediate gain derived from the exploitation of their resources the native owner has no idea of the value of the forests to the country, and is entirely ignorant of the need of doing anything to keep them in perpetuity, and improving them for the benefit of future generations while exploiting them, therefore, as a general principle, and until private owners can see the need of growing as well as cutting trees, in the interests of posterity control is essential, otherwise the forests will continue to deteriorate in value, and either disappear altogether or become overgrown chiefly with soft-wooded rapid-growing species, which always spring up when felling has taken place and the canopy has been opened up, and which very effectively prevents the natural regeneration of the slower growing valuable timber-producing species.

Further the valuable timber-producing tree Mvule, *Chlorophora excelsa, Benth,* is gradually disappearing from native mailos (this is especially noticeable in Kiawge), and unless exploitation is controlled, and its regeneration insisted upon on mailos where it is being eploited, it must eventually cease to exist in any quantity on native estates.

With the exception of Mvule, which has been ruthlessly cut down and sold at ridiculously low prices, and which is becoming scarce in parts of Buganda, the forests owned by natives have not as yet suffered excessive damage from over-exploitation, and the need for control may not be apparent to the casual observer as the transition stage, while being insidious, is slow, but the eventual elimination of valuable species and their substitution by worthless ones, or the disappearance of the forests is certain unless exploitation is controlled and regeneration provided for, and the sooner legislation to provide for the "wise management" of native forests is enacted the better both for the forests and the Protectorate generally.

The Padua Botanic Garden.—The *Revue Horticole* for December 19, 1922 has an article by A. Meunissier on the Botanic Garden of Padua. This is the oldest botanic garden in Italy, and possibly in the world, having been established in 1545 at the instigation of Professor Francescho Bonafede, who created the "Chair of Simples" at the University of Padua in 1533. The area of the garden has remained until now the same as in the beginning, namely, 20.664 mq. In this garden is a specimen of the *Vitex Agnus Castus* planted in 1550, and therefore 372 years old. This is probably the oldest specimen of this species of known age in existence. The tree was referred to by Caspar Bauhin in 1650 as being the most beautiful plant in the garden. Other plants of notable age are the following:

1. The palm of Goethe (*Chamaerops humilis forma arborescens*), planted in 1595; over this palm is erected a glass house to protect it in cold weather. This palm is called the "Palm of Goethe" because, Goethe examined it during a visit to Padua in 1786, and it is said to have served as the basis of his celebrated *Versuch die Metamorphose der Pflanzen zu erklaren.*

2. *Platanus orientalis,* planted in 1680, measuring 6.50 meters in circumference at the base, and having a heighth of 18 meters. A number of persons can be accommodated in a hollow of the old trunk.

3. *Gingko biloba,* 171 years old and 20 meters high; *Magnolia grandiflora* of the same age; *Gymnocladus canadensis,* 160 years old.

4. *Populus alba* 30 meters high; 3.5 meters in circumference.

5. Cedar of Lebanon (*Cedrus Libani*), 19 meters high and 1.9 meters in circumference.

6. A Tulip tree (*Liriodendron tulipifera*) more than 30 meters high.

The greenhouses contain a *Cycas revoluta* 146 years old, a *Cycas circinalis* 122 years old, and a *Dracaena* 120 years old; a Norfolk Island pine (*Araucaria excelsa*) 92 years old and 20 meters high, sheltered by a building especially constructed for that purpose.

The library of the Garden, comprising some ten thousand volumes, includes a number of manuscripts and precious old books, among which is a rare edition of *Herbarium Apuleji Platonici,* published at Rome in 1479. This is said to be the oldest known illustrated book on botany. Among the noted directors of this garden are mentioned Giulio Pontedera (1719-57), a contemporary of Linneaus, and after whom the common pickerel weed (*Pontederia*) of our streams and pounds was named; and Saccardo (1878-1915), the celebrated mycologist, the author of the noted *Sylloge Fungorum,* issued in 22 volumes. The article concludes with a bibliography.

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MEMBERSHIP.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

THE BOTANIC GARDEN is open free to the public daily from 8 a.m. until dark. On Sundays and Holidays at 10 a.m.

ENTRANCES.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 978 Washington Avenue, opposite Montgomery Street.

A DOCENT will conduct parties through the plantations and conservatories. For schedule of regular trips consult the annual *Prospectus*. No trips will be taken with parties of less than ten adults. Children must be accompanied by an adult. *Members of the Botanic Garden* may make special advance arrangements for themselves and friends with the Curator of Public Instruction for trips at other times.

TO REACH THE GARDEN take Broadway (B.M.T.) Subway to Prospect Park station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS
OF THE
BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the directors and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly. Volume I, *Dedication Papers:* comprising scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. Price $3.50, plus postage.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

21. *A sketch of plant classification from Theophrastus to the present.* 16 pages. 1918.

22. *A basis for reconstructing botanical education.* 6 pages. 1919.

23. *Plant families: a plea for an international sequence.* 9 pages. 1920.

24. *Plants and animals of Mount Marcy, New York.* 69 pages, 1 plate, 22 figs. 1920.

25. *Endemism in the Bahama flora.* 10 pages, fig. 1, 1921.

VOLUME II

26. *Plant composition and soil acidity of a Maine bog.* 4 pages, 1921.

27. *The origin of new varieties of Nephrolepis by orthogenetic saltation. II. Regressive variation or reversion from the primary and secondary sports of Bostoniensis.* 18 pages, 6 plates. 1922.

28. *Botanical exploration in Bolivia.* 13 pages. 1922.

29. *Anthracnose of the Boston fern.* 7 pages, 2 plates. 1923.

30. *Varietal resistance and susceptibility of Sorghums to Sphacelotheca Sorghi (Link) Clinton and Sphacelotheca Cruenti (Kühn) Potter.* 12 pages, 2 plates. 1923.

31. *The Melanconis disease of the butternut (Juglans cinerea L.).* 23 pages, 2 plates, 5 figs. 1923.

32. *New bud sports of Nephrolepis.* 21 pages, 2 plates, 4 figures. 1923.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $6.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year.

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BROOKLYN BOTANIC GARDEN RECORD

VOL. XII OCTOBER, 1923 No. 4

EDITED BY
C. STUART GAGER

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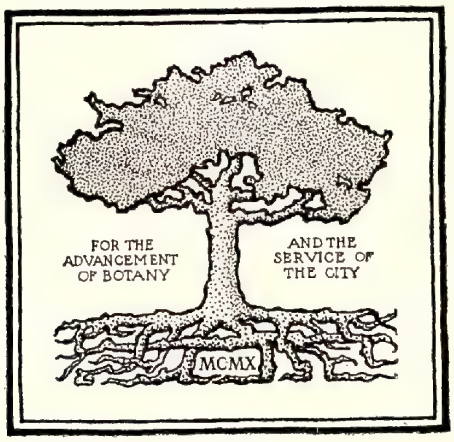

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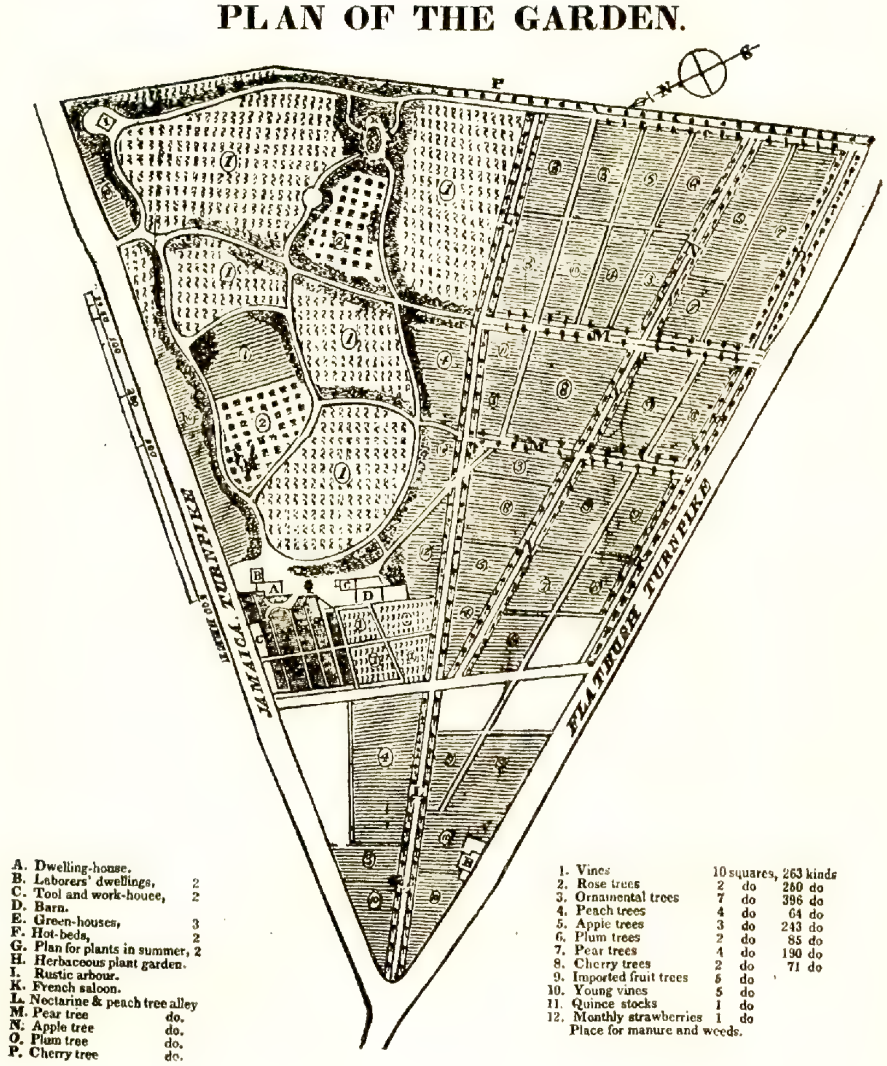
ERRATA

P. 22, line 4. For "Dogwood (*Prunus tomentosa*)" read "Dogwood, *Prunus tomentosa*,"

P. 48, line 3. For "5,777" read "7,577."

P. 106, line 6 from the bottom. For "Bontanical" read "Botanical."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L. Nectarine & peach tree alley
M. Pear tree do.
N. Apple tree do.
O. Plum tree do.
P. Cherry tree do.
1. Vines 10 squares, 263 kinds
2. Rose trees 2 do 260 do
3. Ornamental trees 7 do 396 do
4. Peach trees 4 do 64 do
5. Apple trees 3 do 243 do
6. Plum trees 2 do 85 do
7. Pear trees 4 do 190 do
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11. Quince stocks 1 do
12. Monthly strawberries 1 do
Place for manure and weeds.

FIG. 13.—Plan of Parmentier's "Horticultural and Botanic Garden," Brooklyn, N. Y., 1825–1830. Reproduced from *Supplement for the New England Farmer* (1828). Cf. Fig. 14.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. XII October, 1923 No. 4

THE FIRST "BOTANIC" GARDEN IN BROOKLYN: SUPPLEMENTARY NOTE

In the Botanic Garden RECORD for October, 1922, was an article on "The first 'botanic' garden in Brooklyn," calling attention to the garden established in Brooklyn in 1825 by Andre Parmentier. Within a few moments after reading that article, Mr. Frank Bailey, Chairman of the Botanic Garden Governing Committee, picked up a catalog of a bookdealer and, oddly enough, found listed the catalog of the Parmentier garden. This item was secured by Mr. Bailey and presented to the Botanic Garden library on November 25, 1922. It is of great historical interest for Brooklyn and especially for the Brooklyn Botanic Garden.

The catalog, which is a four-page folder, 21 inches long by 13 inches wide, was issued as a "*Supplement for the New-England Farmer,*" and is entitled as follows:

Periodical Catalog of
Fruit and Ornamental Trees and Shrubs,
Green-house Plants, etc.

Cultivated and for Sale at the *Horticultural and Botanic* Garden of Brooklyn, corner of the Jamaica and Flat-bush Roads, about 2 miles from the city of New York. Andrew Parmentier, *Proprietor*

1828

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Among the items are the following:

Apples.—242 varieties. These are grouped according to the month when they ripen—from July to December–June. Of numbers 141–242 the proprietor says, "The following very good new kinds I received from Europe." At the end of the apple list is the following note:

"About fifty kinds of table apples are grafted on paradise stocks for dwarfs, and which are warranted to produce fruit the second year after planting. They are very ornamental, and make a fine show in a small garden, both when loaded with their beautiful blossoms, and afterwards with fruit."

Of the first 140 varieties of apples some are designated with a B as "the best table fruit," others are marked with a C, as cider fruit. Number 16 is marked "double blossom, ornamental." Among the names of local color and interest in this group are: 71. Vandervere B, 72. American vandervere B, 73. Long Island russet, 110. Flatbush sweeting, 62. Newtown spitzenburg B, and 96. Large yellow Newtown pippin B. The latter apple originated at Newtown, which is just south of Elmhurst, Long Island, and now within the Borough of Queens.

Pears.—190 varieties are listed, designated as melting, buttery, baking, good, and the best. These, like the apples, are grouped according to the month of ripening, from July to January–May. The still famous Bartlett (No. 51, good) and Seckel (No. 22, very fine, melting) are on the list.

Preceding numbers 83–190 is the following note, which further suggests the extent that Parmentier was in correspondence with European growers, and thus, at this early date, enriching American fruit orchards:

"I import every season many valuable new kinds of pears, principally from the Netherlands, which is the real nursery for the best Pears. They are sent from thence to the London Horticultural Society, by my eldest brother the Chevalier Parmentier, or by my old correspondent and friend Mr. the Professor Van Mons." *

* Jean Baptiste Van Mons was born at Brussels, Nov. 11, 1765, and died at Louvain (where he was professor), Sept. 6, 1842.

At the end of the Pear list is the following note: " I have about fifty kinds of table Pears engrafted on Quince stocks for dwarfs or pyramids. They bear fruit very soon."

There are 71 Cherries listed and five varieties of Quince. Numbers 42–71 of the cherries are imported.

Grape Vines.—This group is headed with a list of twelve varieties " of the finest table grapes," which are offered " by way of subscription, Price $6, to be paid for on delivery." " The whole of these are from the most northerly part of France; and experience has proved that they can be successfully raised in this country." The proprietor offers to replace those that do not grow if his directions for planting are followed. There follows a list of 136 varieties (148 in all) of European grapes, the list ending with " 148. *Vigne de Jericho*—enormous bunches, weighing sometimes 10 to 20 pounds, but wants the green-house here—in Georgia, Florida, and more south it will ripen in the open air." According to the legend of the map on page 4 there were in all 263 kinds of " vines."

There are also offered seven varieties of native grapes (Nos. 149–155), including 149. Isabella from South Carolina, 150. Catawba purple, 151. Schuylkill muscadel, 152. Worthington, black, 153. Loughborough, 154. Oowigsburgh, white, and 155. Scupernon. The " Scupernon " (now written *Scuppernong*) is a southern variety, and one of the most important varieties of the New World species, *Vitis rotundifolia.* It is not now considered hardy in the north. The Catawba (thought to be a hybrid between the New World species *Vitis Labrusca* and the Old World species *Vitis vinifera*) was introduced into the trade 1823 in the District of Columbia by John Adlum, who secured cuttings of it from a Mrs. Schall in Clarksburgh, Maryland. This indicates that this early Brooklyn Garden offered the most recently developed varieties.

The Concord grape, a seedling sport of *Vitis Labrusca,* which arose from a seed planted by Ephraim Bull in his Concord (Mass.) garden in 1843, was not introduced to the trade until 1854, or 26 years after the date of Parmentier's Catalog.

Other interesting items in the Catalog are 85 varieties of plum,

3 mulberries, 64 peaches, 15 nectarines, 18 apricots, 24 kinds of gooseberries imported from England every year, 20 kinds of nut trees, including English walnut, filbert, pecan, American and Spanish chestnuts, and chincapins.

There are offered "several kinds" of figs, medlars ("*mespilus germanica maxina*"), American persimmon ("*diospiros virginiana*"), European date plum ("*diospiros lotus*"), and the "Papaw or custard apple, *anona glabra.*"

Of currants there are 9 varieties and of strawberries 17, one of which was the "White alpine, or monthly everbearing, without runners, recently raised by the Count of Vindé." This new introduction was listed at One Dollar a plant, a very high price for those days.* Three species of barberry are listed, 5 blackberries, 6 whortleberries, and the common cranberry.

The list of ornamental trees and shrubs includes the surprising number of 235 varieties of roses, of which 169 are hardy. Among wild flowers offered for sale is the trailing arbutus (*Epigea repens*), the extinction of which by commercial exploitation we are now fighting. In addition to the roses there are 361 other species and varieties of ornamental trees, listed according to their ultimate height.

In addition to the woody plants Mr. Parmentier states that his "collection of Herbaceous Plants is very good, and contains many species of Paeony, Fleur de Luce, Phlox, Speedwell, Lychnis, Carnation, Pink, Lilies, &c. &c.," a catalog of which is announced to appear shortly, together with a list of greenhouse plants. It is doubtful if so rich a variety of plants can be found listed today in the catalog of any single American nursery.

In view of the great difficulty experienced in the growing of evergreens in the present Brooklyn Botanic Garden, it is of interest to read Mr. Parmentier's note that "The only large evergreen which succeeds in this latitude, is the Balsam Fir, *pinus balsamea*" (*Abies balsamea*). This, too, was long before the days when the

* According to a newspaper notice of November, 1922, the sum of $50,000 was recently paid in the United States for a single plant of an everbearing variety of strawberry. This recalls the famous prices paid for tulips in the Netherlands during the famous tulip mania of 1634–38, when a record price of 13,000 florins was paid for a single bulb.

atmosphere of this region was polluted with the smoke and fumes from innumerable chimneys and stacks. The evaporating power of the air that blew over the Parmentier garden was also doubtless less than that which blows over the present Brooklyn Botanic Garden. With the growth of the City this air became exposed to acres of tall brick buildings and concrete and asphalt pavements, which materially increase its evaporating power before the air reaches the Botanic Garden. The records of atmometers (which measure the evaporating power of the air) show that the air has an evaporating power at the Garden greater than over any area of natural vegetation on Long Island.

After calling attention to the fact that he had "laid out several landscape gardens in this country," and had "made many designs for a great number of gentlemen," Mr. Parmentier gives his views as to what should be the guiding principles in landscape design. "It has been reserved," he says, "for the good taste of the present age to make many advantageous changes in the embellishment of gardens, and to reinstate Nature in the possession of those rights from which she has too long been banished by an undue regard to symmetry.

"Our ancestors gave to every part of the garden all the exactness of *geometric* forms: they seem to have known of no other way to plant trees, except in straight lines; a system totally destructive to beauty. We now see how absurd it was, except in the public gardens of a city, to apply the rules of architecture to the embellishment of gardens. . . . Gardens are now treated like natural landscapes, the charms of which are generally injured by any interference of art."

This was one of the early voices calling for the naturalistic treatment as a controlling motive in landscape architecture; the words quoted were published 31 years before Olmstead and Vaux, who had designed Central Park in New York, published their *"Design for Prospect Park in the City of Brooklyn."* These two parks, as is well known locally, were among the first in this country to be laid out primarily with a view to preserving and restoring natural features.

The map of Mr. Parmentier's garden is here reproduced from

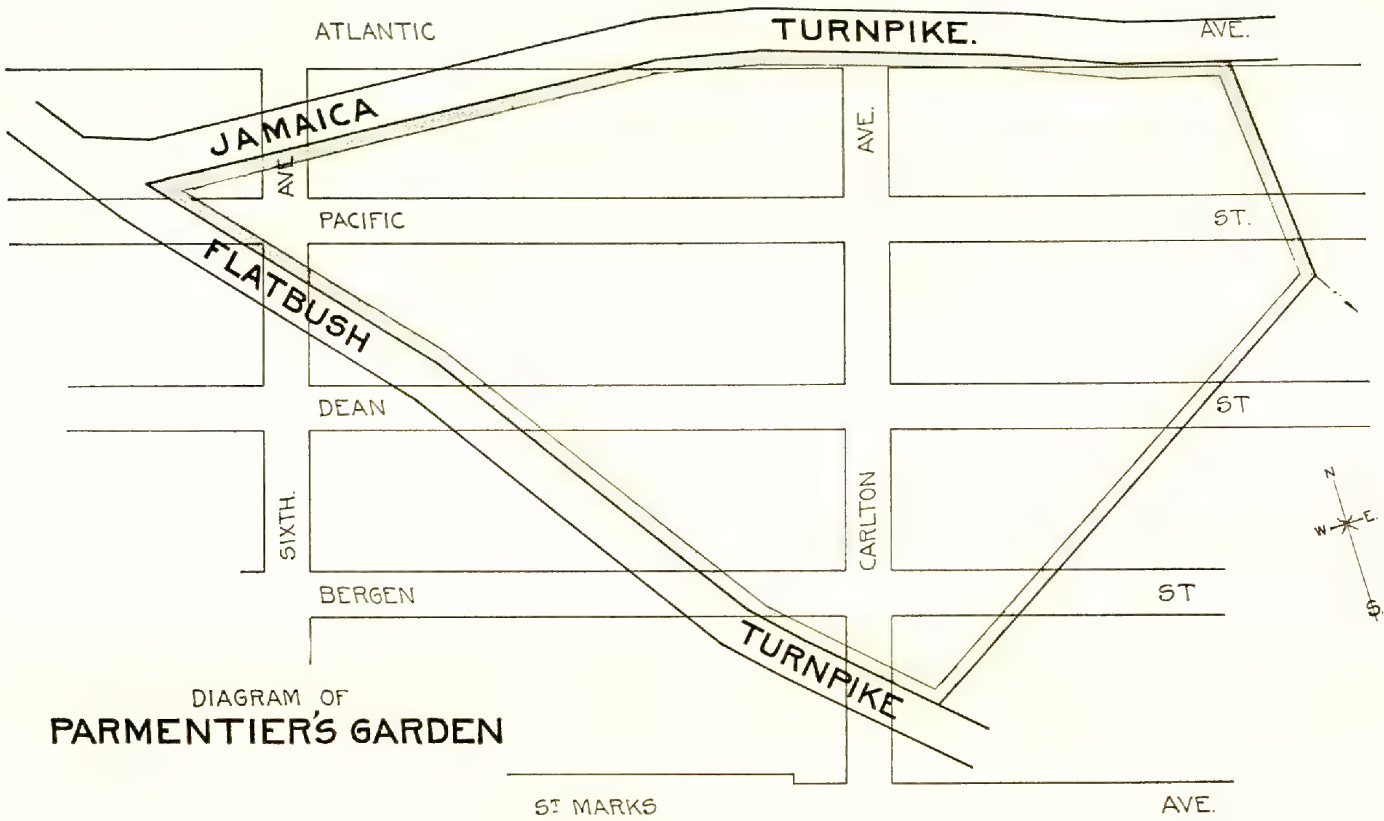

Fig. 14.—Diagram Showing the Location of Parmentier's "Horticultural and Botanic Garden," Brooklyn, N. Y., 1825–1830. Cf. Fig. 13.

his catalog (Fig. 14). On page four of the catalog is a description of the garden, quoted from the August (1828?) number of the *New York Farmer and Horticultural Repository.* It is there referred to as a "delightful spot," and as marking "an era in the history of our horticulture." "We do not know," the article continues, "of an instance where the several departments of the gardener's labours are combined so extensively and with such scientific skill: nearly 25 acres of ground are enclosed, and the inhabitants of the vicinity, and those who recollect the original site of the garden, now view with astonishment, in the short space of three years, one of the most stony, rugged, sterile pieces of ground on the whole island, which seemed to bid defiance to the labours of man, now stored with the most luxuriant fruit and blooming with the most beautiful flowers."

Figure 13 shows the location of the Parmentier garden with reference to existing streets in Brooklyn.*

It is interesting, in this connection, to note the persistence of the botanic garden idea on Long Island. The pioneer institution was that established by William Prince at Flushing, L. I., in 1737, and given the name "Linnaean Botanic Garden" in 1793. This overlapped and outlived the garden of Mr. Parmentier. The next was the abortive attempt to establish the "Brooklyn Hunt Botanical Garden," in 1855. This was followed, in 1861, by the plan for a botanic garden as one of the features of Prospect Park. No attempt was ever made to carry this plan into execution. Finally, in 1910, the plans for establishing the present Brooklyn Botanic Garden became effective.

The history above briefly sketched explains the expressions of skepticism as to the probable success of the present Garden which were voiced by some of the older residents of Brooklyn during the first year or two of the Garden's existence. "It will not continue long," the writer was told, "it has been tried several times before and has always failed!"

C. Stuart Gager

* We are indebted to Mr. Edwin P. Clark, of the Title Guarantee and Trust Co. (Brooklyn), for the map reproduced here as figure 13. This gives the exact location of the Garden, which was only approximately indicated in the footnote at the bottom of page 116 of the Record for October, 1922.

DROUGHT AND STORM DAMAGE

The severe drought of twelve weeks, extending from about April 1, was broken on the afternoon of June 26 by a heavy thunderstorm, with only slight precipitation (0.29 inch), but with a gale that apparently centered over the Botanic Garden and adjacent Prospect Park, working great damage to vegetation. Three of the largest trees in the Garden, oriental planes, standing on the crest of the hill south of the lake, were uprooted and blown over. Their age, based on the rings of growth, was 25–30 years. Their loss is particularly regrettable, as the Botanic Garden has only a very small number of large trees.

A large Carolina poplar, a foot or more in diameter, situated north of the local flora section, had its trunk snapped off at a height of about 20 feet from the ground. Two Norway maples, part of the avenue planting along Flatbush Avenue, were blown over. A small but beautiful tree of *Robinia Pseudo-acacia* var. *Rehderi* (a dwarf round-topped form of the common locust), which had been weakened by borers, had almost every one of its branches whipped off. One of the weeping willows overhanging the drum bridge in the Japanese Garden was toppled over, but this it was possible to straighten and support with guy wires. Its companion tree was badly damaged by the breaking of branches.

Amongst herbaceous plants the worst sufferers were the hardy water lilies, as the hail, which accompanied the wind, perforated almost every leaf. Before the storm these lilies were at their best. The newly set-out cannas and bananas had their leaves ripped to shreds by hail and wind.

The bamboo poles on the ridge of the Tea House in the Japanese Garden were blown off, as were also about 30 tiles from the roof of the Laboratory Building. Several additional tiles were broken by the falling of a stone ball ornament which was blown off the cupola.

Fourteen panes of glass in the Conservatories were broken by the hail and wind.

The severity of the drought is indicated by the precipitation figures of the U. S. Weather Bureau. The normal precipitation for the three months April, May, and June (based on records for

the past 58 years) is 9.74 inches. The precipitation recorded for these three months this year is 5.50 inches, or 4.24 inches (nearly one half) below the normal. The accompanying high temperatures, the highest on record for the corresponding dates in 30 years or more, made a severe demand on the drought-resisting power of the vegetation. Leaves dropped from some of the trees and shrubs, and plants like *Pachysandra terminalis* and others wilted to the ground.

The situation was aggravated on June 21 by the contractors, who were excavating on Washington Avenue with a steam shovel, breaking one of the water pipes. This necessitated shutting off the water supply to the entire Botanic Garden (including the conservatories, buildings, and grounds) for an entire day, thus putting a stop to all artificial irrigation on one of the hottest and driest days of the season.

The brown lawns showed almost no trace of green color except for here and there a vigorous thriving plant of white daisy, plantain, dock, and a few other weeds whose green foliage and increasing height (on account of no mowing of the lawns for several weeks) caused them to stand out in sharp contrast. Distressing as this was from the standpoint of maintenance of the lawn, it afforded a striking illustration of weediness, certain plants being weeds because, owing to their deep root-system and other characters, they can succeed under adverse conditions where lawn grass and other plants fail.

The drought was finally broken by the precipitation of July 4–6, but drought conditions obtained throughout most of August and September, the second dry spell being broken by the rains of September 22–23. The Garden, however, held its own remarkably well during these adverse weather conditions, and, as a whole, was looking better in late September than at any previous year.

NOTES

The Alfred T. White scholarship of $100 was presented to Mr. Gordon Utter at a meeting of the Boys' and Girls' Club on September 22, 1923. The president of the club, James Hall, presided. The basis of the award was explained by Miss Shaw, curator of

elementary instruction, and brief remarks were made by two of the three members of the club who have received the award in previous years—Mr. Harold Uhrbrock, Cornell 1924, and Mr. John Wille, Cornell 1926. Miss Lillian Baker, who received the award in 1921 and who is now studying at New Rochelle College in preparation for teaching botany, was unable to be present. The presentation was made by Dr. Gager. Mr. Utter has entered Alfred University, Alfred, N. Y. As previously noted in the RECORD, this scholarship is awarded annually to the boy or girl who has done work of superior merit for at least three years in our juvenile courses, and who is about to continue some line of botanical or closely related work in a college or university.

Gift of Cannas.—On June 13 the Garden received from the Conard & Jones Company, West Grove, Penna., a gift of 480 cannas, representing 32 varieties. They were planted out the following day in the four beds surrounding the two beds of bananas, the six beds comprising the representation of the order Scitaminales, located on the east side of the brook, between the lily order and the grasses. During August, September, and well into October the beautiful display of canna blooms excited a great deal of popular interest.

Miss Charlotte S. Young, for a number of years a member of the teaching staff of the Department of Biology of Erasmus Hall High School, has been appointed curatorial assistant at the Brooklyn Botanic Garden beginning as of September 1, 1923.

A series of plant stories for children, by Miss Ellen Eddy Shaw, curator of elementary instruction, is appearing in the *Junior Home Magazine,* a new periodical for children. The first story, illustrated by reproductions of photographs taken by Mr. Buhle in our conservatories, appeared in the July, 1923, number and was entitled " Peter and the garden zoo," dealing with tiger lilies, snapdragons, foxgloves, and elephant's ears (*Colocasia*). The remaining articles have the following titles: Silk making from green leaves (August); Peter takes an aeroplane trip in the fields (September); How Peter was shot in the woods—witch hazel (Octo-

ber); A Thanksgiving fruit basket (November); Peter and the talking pines (December).

A memorial rose garden has been planted around the sundial north of the Children's Building. The roses have been given by parents in memory of their sons and daughters, formerly members of our Boys' and Girls' Club.

One of the floating ferns, Azolla caroliniana, has been an object of considerable popular interest this season. Last spring a handful of the plants that wintered over in our conservatory was placed in one of the pools of the brook in the Ecological Section. The plant multiplies rapidly vegetatively and by September it had almost completely covered the surface of the water for about 900 feet from the Ecological Section to the terminal pool. On account of its ability quickly to cover the surface of the water Azolla has been utilized in Panama and elsewhere to help eradicate mosquitoes. Where Azolla grows the mosquito larvae are not able to come to the surface to breathe, and consequently die.

Visits of Summer Classes.—On July 1 Prof. N. M. Grier and biology class of five students from the Biological Laboratory, Cold Spring Harbor, L. I., visited the Botanic Garden, to inspect the plantations, conservatories, and library.

On Wednesday, July 18, Dr. Andrew Drushel visited the Brooklyn Botanic Garden with his nature study class. Dr. Drushel has charge of the nature study class in the Harris Normal School for Teachers, St. Louis, Mo. The object of his visit was to study the methods by which the Brooklyn Botanic Garden articulates with the schools and also the method employed in our outdoor garden for children.

The new museum of the Buffalo Society of Natural Sciences, to be erected in Humboldt Park, will, according to the February, 1923, issue of *Hobbies,* have a great Central Floral Hall, which is announced as a "unique feature found in no other museum in the world." Along both sides of this hall are openings, five on each side, leading to smaller exhibit halls. Alongside of each of these openings will be introductory exhibits. These exhibits will constitute what might be called prefaces to the exhibits found in the

smaller exhibit halls. One of these exhibit halls will contain a botanical museum in which emphasis will be placed upon the flora of western New York, with a special room devoted to economic botany. The plan for the completed building provides for conservatories to be entered from the main museum by passing through a garden.

A new kind of paper is being used by the Department of Agriculture of the Uganda Protectorate. Letters sent out from the Office of the Director contain the following notice in the upper left-hand corner: "This paper is manufactured from elephant grass (*Pennisetum purpureum*) grown in the Uganda Protectorate." In view of the rapidly diminishing supply of wood pulp and other raw materials for paper making in this country, it is interesting to learn of the possibilities of elephant grass. The paper made from it appears to be of excellent quality.

Redwood Grove Saved as Pioneer Memorial.—A wonderful tract of 310 acres of giant Redwoods on the California State Highway near Orick, Humboldt County, and about 60 miles north of Eureka, has been given to the State of California as a memorial to Humboldt County's pioneers. It is the gift of Mrs. Zipporah Russ, of Ferndale, Humboldt County, in memory of her husband, Joseph Russ, who came around the Horn to California in 1852, and also in memory of all the early settlers who helped to build up Humboldt County and the state. Mrs. Russ, as a young girl, crossed the Plains with her family in 1853. The tract contains 166 acres and has a stand of close to thirty million feet of Redwood, as well as much other timber. It is admirably situated on the State Highway above Orick and is crossed diagonally by Prairie Creek, a good-sized stream which adds to the beauty of the grove and to its advantages from the park and recreational standpoint. The grove was dedicated on September 2, 1923.

Some of the largest trees of the Redwood belt are found on this tract of timber. One enormous Sequoia particularly has been discovered, which is believed to be among the largest in existence. Not only the Redwoods, but also the massive firs, hemlocks, maples, spruce, oaks, and other trees found on this tract, together with the giant ferns and other undergrowth, make it an area of unusual

beauty. It is still in its primeval state, and many of its acres have probably never been trodden by man.

This gift has been announced by J. D. Grant, of San Francisco, Chairman of the Board of Directors of the Save the Redwoods League. In making the announcement Mr. Grant expressed the appreciation of the League both because of the intrinsic value of the gift and because it symbolizes the interest of Californians in the movement to save for posterity some of the Redwoods. The Humboldt County Pioneer Memorial is deeded to the State to be held forever as a public Redwood Park, and it is stipulated that the timber thereon shall never be cut or destroyed, but that the tract shall be kept in its natural condition. By the roadside a granite boulder has been placed and on it a bronze tablet bearing a suitable inspection.

San Mateo County Saves Redwood Grove.—Officials of the Save the Redwoods League have sent a message of congratulation to the supervisors of San Mateo County, who at their last meeting voted to purchase for public use a splendid grove of Redwoods, known as the McCormick Tract, on the county road 6 miles from Pescadero. This action means the preservation of the few large tracts of primeval redwoods remaining in that immediate region, which once was covered with a forest of giant trees. The grove is 310 acres in area, and contains approximately 18 million feet of timber. It is a veritable wonderland of forest growth, and on the banks of Pescadero Creek, within this tract, are numerous camping places for the use of the traveling public. The grove was purchased for $70,000.

Standardized Plant Names.—The American Joint Committee on Horticultural Nomenclature, made up of representatives of the American Association of Nurserymen, Ornamental Growers' Association, American Society of Landscape Architects, American Pharmaceutical Association, American Institute of Park Executives, and the Society of American Florists and Ornamental Horticulturists, announce the publication of the *Official Catalogue of Standardized Plant Names.* The chairman of the Committee was Mr. J. Horace McFarland, and the secretary Mr. Harlan P. Kelsey. The preparation of the catalog was in immediate charge of a subcommittee composed of Mr. Frederick Law Olmsted, Mr.

Frederick V. Coville, and Mr. Kelsey, with the cooperation of the Dahlia, Gladiolus, Iris, Peony, Pomological, Rose, and Sweet Pea Societies, and the Seed Trade Association. The Catalogue "is not offered as a new and different scientific system of nomenclature, but rather as a sane and workable harmonization of the present confusion." Its aim "is *to make buying easy* by providing definite and uniform names, both scientific and 'common,' for American horticultural commerce." Changes proposed by "botanists and terminologists" will not disturb commercial and educational relations for a period of years, or until the Official Catalogue is revised.

American Stains for Biological Work.—The Commission on Standardization of Biological Stains, operating originally under the auspices of the National Research Council, but now on an independent footing, has published a series of reports in *Science* from 1921–1923. A circular of July 28, 1923, issued by the Commission, contains the following statement:

"In general it can be said, however, that American stains have been found to be reliable. It seems, furthermore, that the prestige of the German stains was largely unjustified. It proves that different batches both labeled the same and both obtained from the same reliable German concern may vary greatly in their composition. Practically all of these stains contain a large amount of inert materials and many of them are actually mixtures of various dyes not indicated in any way on the label. This suggests that such stains are probably merely textile dyes bought and rebottled for biological use without any attempt at purification.

"There are, on the other hand, two or three American concerns at the present time who are giving a great deal of time and money to the purification of stains for biological purposes and to testing them as to their reliability. As these concerns are working in cooperation with the Commission they are able to count on it to test their products; and as a result their stains are as reliable as is possible to get them at the present time. The Commission is not prejudiced against German stains but merely considers it important to have domestic sources of such important articles as these and believes that cooperation in the manufacture and standardization of stains can only be obtained by dealing with companies that are close at hand."

Children's Garden Exhibit.—The Tenth Annual Children's Garden Exhibit was held in the rotunda of the Laboratory Building on Friday and Saturday, September 28 and 29, 1923. The vegetables and flowers exhibited by both individual boys and girls and by schools were, on the whole, superior to those exhibited in previous years. The judges were Mr. Montague Free, Mr. Van Evrie Kilpatrick, and Dr. Arthur H. Graves.

The prizes awarded were presented on Saturday afternoon, October 13, in the auditorium, Miss Shaw presiding. Medals were presented by Dr. Gager as follows: *For the best individual display,* gold medals to 19 boys, 6 girls, and one school (P. S. 104); bronze medals to 12 boys and 8 girls. *For work of superior merit* in the children's garden and courses, including general helpfulness and fine spirit, silver medals to 5 boys and 5 girls; bronze medals to 9 boys and 14 girls. *For excellent work,* two books from the Flatbush Garden League to Marie Einbeck and Stanley Kosowicz. Honor gold medals given by Miss Shaw were presented by her to Jeanette Midas and Martin Nash. The silver cup from the Garden Teachers Association to James Loftus Hall; a silver cup, competed for only by girls, was given by Mrs. Glentworth R. Butler, and presented by her to Isabell E. Kline. *For the best small school display* of flowers and potted plants, two books, as second prize, were presented to Public Schools 70, 89, and one book as honorable mention, to Public Schools 46, 69, 182. *For best window box display,* two books as second prize to P. S. 41, one book as honorable mention to P. S. 90 and P. S. 147.

The First Prize in Class C (*Window Box Display*), a loving cup, to P. S. 49. This now becomes the property of this school, having been won three times. The loving cup in Class B (*Small School Display*) to P. S. 129, and the Trophy as First Prize in Class A (Vegetables), Small School Display, to P. S. 109. This is a new trophy, the first one having become the permanent property of P. S. 89 last year, after the third award. The new trophy, a bronze tablet on wooden back, has at the top, in bas relief, a picture of a large group of public school classes leaving the Laboratory Building after an educational motion-picture lecture.

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GENERAL INFORMATION

Membership.—All persons who are interested in the objects and maintenance of the Brooklyn Botanic Garden are eligible to membership. Members enjoy special privileges. Annual Membership, $10 yearly; Sustaining Membership, $25 yearly; Life Membership, $500. Full information concerning membership may be had by addressing *The Director, Brooklyn Botanic Garden, Brooklyn, N. Y.* Telephone, 6173 Prospect.

The Botanic Garden is open free to the public daily from 8 a.m. until dark. On Sundays and Holidays at 10 a.m.

Entrances.—On Flatbush Avenue, near Empire Boulevard (Malbone Street), and near Mt. Prospect reservoir; on Washington Avenue, south of Eastern Parkway and near Empire Boulevard; on Eastern Parkway, west of the Museum Building.

The street entrance to the Laboratory Building is at 978 Washington Avenue, opposite Montgomery Street.

A Docent will conduct parties through the plantations and conservatories. For schedule of regular trips consult the annual *Prospectus*. No trips will be taken with parties of less than ten adults. Children must be accompanied by an adult. *Members of the Botanic Garden* may make special advance arrangements for themselves and friends with the Curator of Public Instruction for trips at other times.

To Reach the Garden take Broadway (B.M.T.) Subway to Prospect Park station; Interborough Subway to Eastern Parkway-Brooklyn Museum Station; Flatbush Avenue trolley to Empire Boulevard; Franklin Avenue, Lorimer Street, and Tompkins Avenue trolleys to Washington Avenue; St. John's Place trolley to Sterling Place and Washington Avenue; Union Street and Vanderbilt Avenue trolleys to Prospect Park Plaza and Union Street.

PUBLICATIONS
OF THE
BROOKLYN BOTANIC GARDEN

RECORD. Established, January, 1912. An administrative periodical issued quarterly. Contains, among other things, the *Annual Report* of the directors and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events. Free to members of the Garden. To others one dollar a year; 25 cents a copy.

MEMOIRS. Established, July, 1918. Published irregularly. Volume I, *Dedication Papers:* comprising scientific papers presented at the dedication of the laboratory building and plant houses, April 19–21, 1917. Price $3.50, plus postage.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

21. *A sketch of plant classification from Theophrastus to the present.* 16 pages. 1918.

22. *A basis for reconstructing botanical education.* 6 pages. 1919.

23. *Plant families: a plea for an international sequence.* 9 pages. 1920.

24. *Plants and animals of Mount Marcy, New York.* 69 pages, 1 plate, 22 figs. 1920.

25. *Endemism in the Bahama flora.* 10 pages, fig. 1, 1921.

VOLUME II

26. *Plant composition and soil acidity of a Maine bog.* 4 pages, 1921.

27. *The origin of new varieties of Nephrolepis by orthogenetic saltation. II. Regressive variation or reversion from the primary and secondary sports of Bostoniensis.* 18 pages, 6 plates. 1922.

28. *Botanical exploration in Bolivia.* 13 pages. 1922.

29. *Anthracnose of the Boston fern.* 7 pages, 2 plates. 1923.

30. *Varietal resistance and susceptibility of Sorghums to Sphacelotheca Sorghi (Link) Clinton and Sphacelotheca Cruenti (Kühn) Potter.* 12 pages, 2 plates. 1923.

31. *The Melanconis disease of the butternut (Juglans cinerea L.).* 23 pages, 2 plates, 5 figs. 1923.

32. *New bud sports of Nephrolepis.* 21 pages, 2 plates, 4 figures. 1923.

LEAFLETS. Established, April 10, 1913. Published weekly or biweekly during April, May, June, September, and October. The purpose of the *Leaflets* is primarily to give announcements concerning flowering and other plant activities to be seen in the Garden near the date of issue, and to give popular, elementary information about plant life for teachers and others. Free to members of the Garden. To others, fifty cents a series. Single numbers 5 cents each.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

SEED LIST. Issued in December of each year.

AMERICAN JOURNAL OF BOTANY. Established, January, 1914. Published, in coöperation with the BOTANICAL SOCIETY OF AMERICA, monthly, except during August and September. Subscription, $6.00 a year.

ECOLOGY. Established, January, 1920. Published quarterly in coöperation with the ECOLOGICAL SOCIETY OF AMERICA. Subscription, $4.00 a year.

GENETICS. Established, January, 1916. Bi-monthly. Subscription, $6.00 a year.